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MACWORLD

THE MACINTOSH® MAGAZINE

March 1993 $3.95 Canada $4.95

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11 Software Authoring Tools Compared

SPECIAL MULTIMEDIA GUIDE

ADDING SOUND TO YOUR PRODUCTIONS

TOP 10 CD ROMS

First Annual Winners

PLUS

NEW APPLE SCANNER AND PRINTERS TESTED

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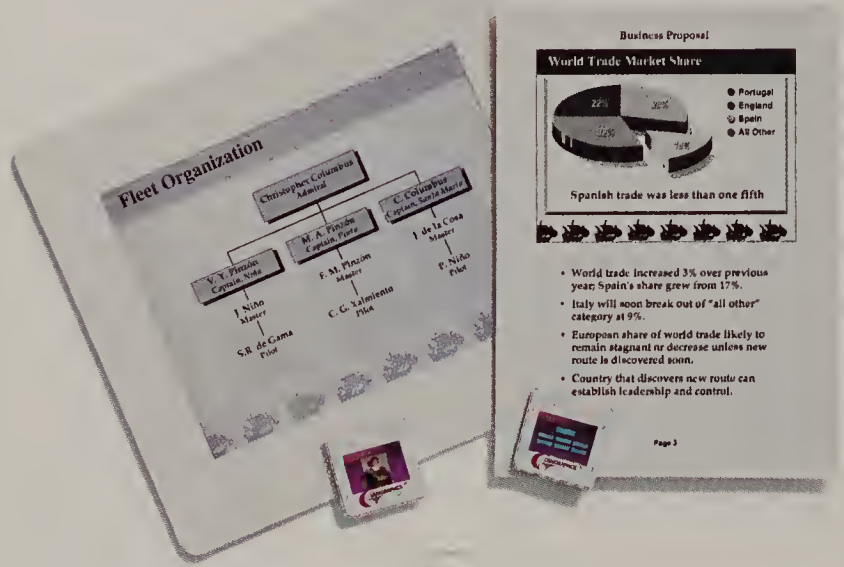

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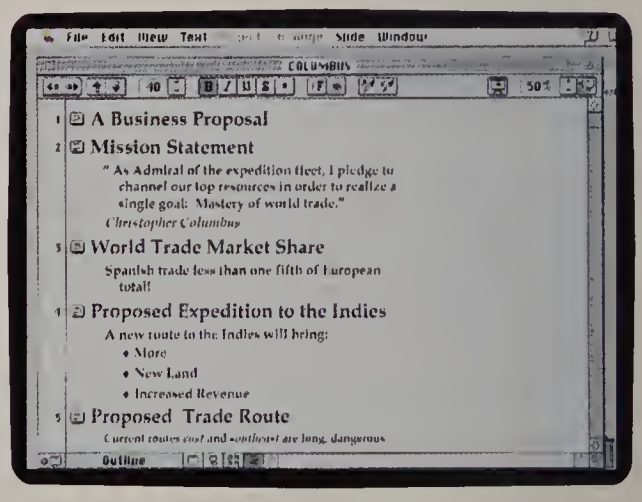

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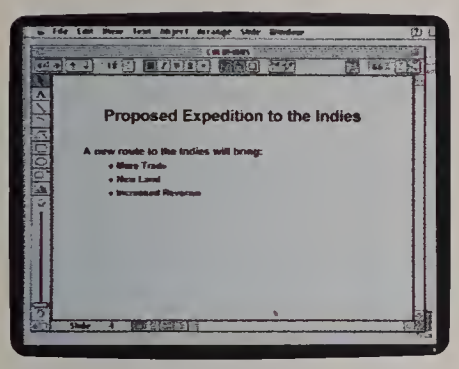

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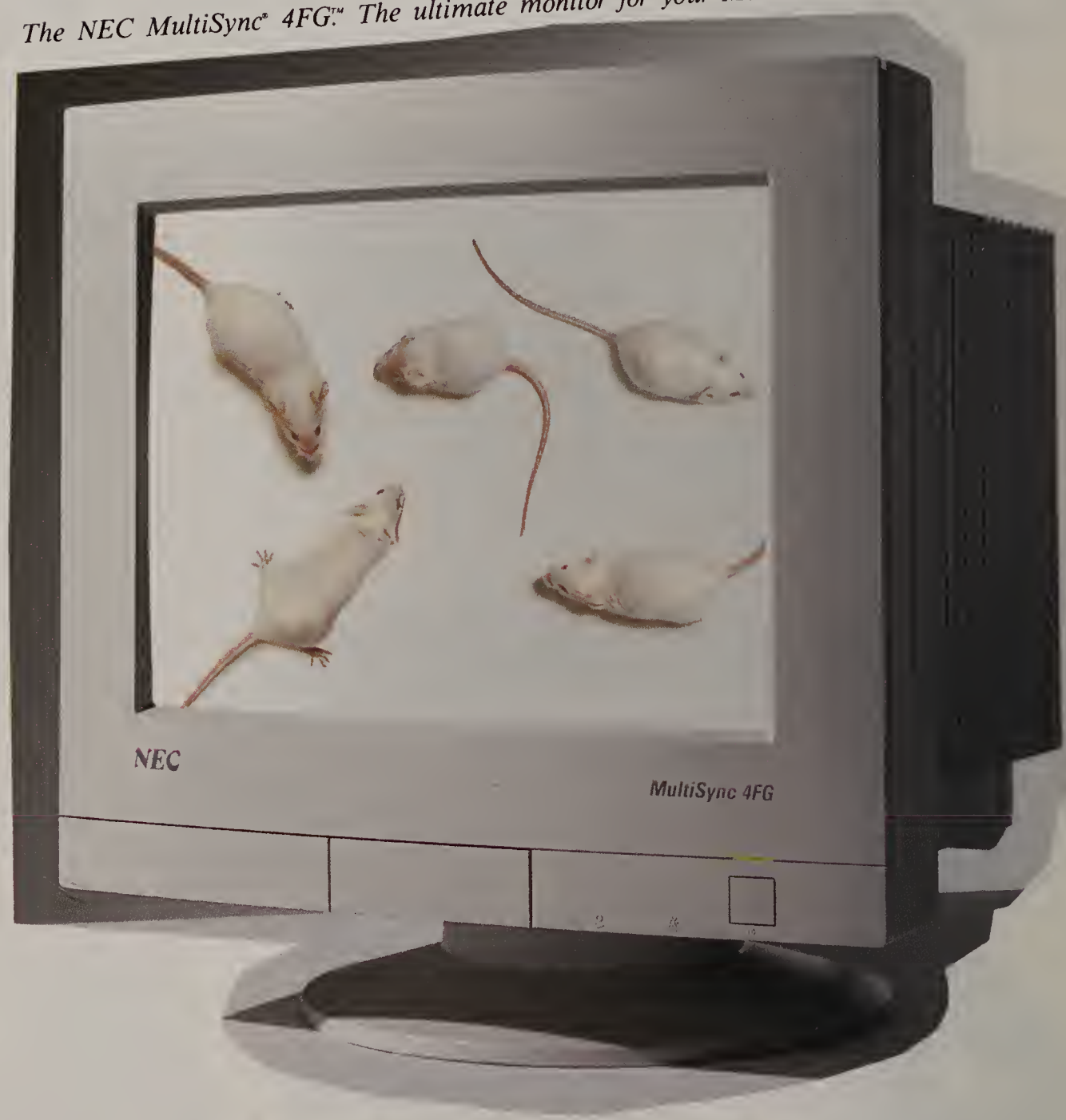
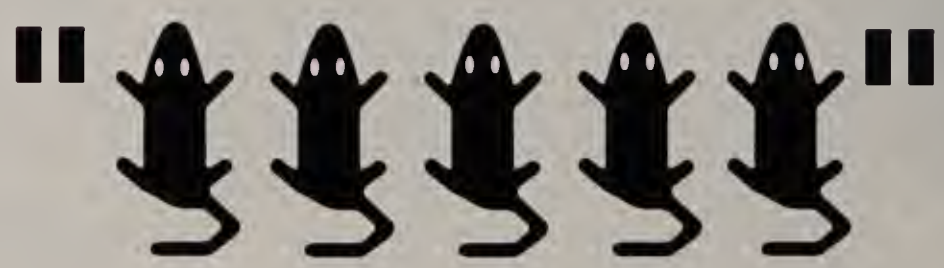
BA2

Announcing a

At NEC, we've developed hundreds of computer products expressly for Mac systems: from our highly-acclaimed MultiSync monitors, MultiSpin™ CD-ROM readers and Silentwriter® laser printers, to our Professional Graphics Series, which includes our new 27" MultiSync 3PG data monitor and MultiSync 6PG and 9PG Projection Monitors for images as large as 25 feet.

The NEC MultiSync® 4FG.™ The ultimate monitor for your Macintosh®.





–MacUser Magazine Aug.'92

better mousetrap.

The least you should do for your Mac.

The NEC MultiSync® 3FGx™ monitor.

In 1992, the only monitor to snag the coveted five-mice rating was an NEC monitor: the MultiSync 4FG. After running it and 13 others through the most rigorous technical evaluation they'd ever used for testing monitors, *MacUser* magazine concluded, "If you're looking for the sharpest display, the NEC MultiSync 4FG should be your top choice." What more can we say? Glad you asked.

Our AccuColor™ Control System prompted *MacUser* to make special mention of the "easy color adjustments." AccuColor lets you adjust on-screen colors, so if you're looking for mouse-tail pink, that's what you'll get.

If, however, color control is not a priority for you, you'll be very happy with NEC's MultiSync 3FGx monitor, which shares almost all of the 4FG's award-winning features. Both monitors produce sharp, bright images, crisp graphics and vibrant colors. An Invar shadow mask provides increased brightness without loss of focus.

Another big idea—the display area. The large 15″ screen (13.8″ active display area) coupled with FullScan™ capability for edge-to-edge images gives you a larger display area than typical 13″ or 14″ RGB monitors.

How do you make an NEC MultiSync monitor work with your Mac? Just plug it in, using NEC's free FG/Mac cable adapter. It works with the Mac's on-board video, so you won't need an add-in video board.*

Both monitors are compatible with the Mac® II family, Quadra™ series, LC's, PowerBooks™ and PC systems. So you can use just one monitor for both types of platforms. *MacUser* noted the "powerful and versatile controls make switching from a Mac to a PC a snap."

And to make these monitors as user-friendly as possible, we've included ergonomic features such as a tilt/swivel base and up-front user controls. Plus, our Reduced Magnetic Field™ technology meets the strict Swedish MPR II guidelines for magnetic field emissions.

There are lots of reasons for considering an NEC MultiSync monitor for your Mac—the sharp, bright images, the vibrant colors, the large display area, the flexibility, the compatibility—to name five. And the ♟♟♟♟♟ to name five more.

For more information on our award-winning monitors, call 1-800-NEC-INFO (in Canada: 1-800-343-4418). Or for a complete brochure via fax, call NEC FastFacts™ at 1-800-366-0476, request #62234.

*For Macintosh 640 x 480 resolution, just attach NEC's FG/Mac cable adapter and plug into: Macintosh IIsi, IIci, LC, LCII, IIvx, IIvi, Quadra™ 700, Quadra 900, Quadra 950, Performa™ 400, Performa 600, PowerBook™ 160, PowerBook 180, and the PowerBook 210 and PowerBook 230 with either the DuoDock™ or MiniDock.™ Or with an add-in video card: Macintosh II, IIx, IIcx, IIfx, PowerBook 140, PowerBook 145, and PowerBook 170. Get the 640 x 480 FG/Mac adapter free by calling NEC at (312) 622-7427 8:30AM-5PM CST.

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Circle 68 on reader service card

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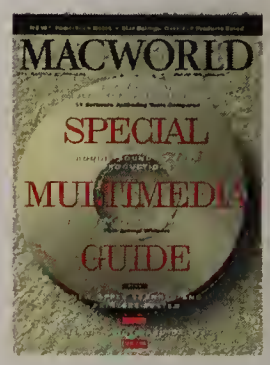

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CHECK OUR MULTIMEDIA GUIDE (PAGE 98) FOR THE TOP CD ROMS, ENTRY-LEVEL-TO-HIGH-END AUTHORING PROGRAMS, AND TIPS ON ADDING SOUND TO YOUR PRODUCTIONS. (PHOTO BY PAUL FRANZ-MOORE.)

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Looks like Mac users just got

The new generation HP LaserJet 4M printer.

LaserJet

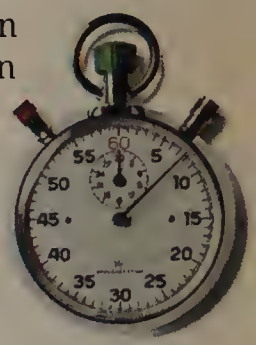
The HP LaserJet 4M is the one for all. Macintosh and PCs alike. This new generation provides superior output with 600 dpi, Resolution Enhancement technology and microfine toner. 6MB built-in memory means that PostScript files and full-page graphics print out crisp, clear and fast.

4M

4M 4M 4M 4M 4M

- True 600 dpi creates rich, full-dimensional text and graphics.
- Smoother curves, no jagged edges, thanks to HP's exclusive Resolution Enhancement technology.
- Microfine toner makes 600 dpi output look even sharper.
- 35 PostScript Type 1 typefaces for Mac and PC PostScript users, and 35 Intellifont and 10 TrueType typefaces for PC users produce a broad range of document styles.

At last. Hewlett-Packard introduces a laser printer built specifically for the Mac from the ground up—the new LaserJet 4M. A laser printer for Mac users with everything you expect. And, more importantly, everything you need. From built-in PostScript Level 2 software from Adobe and 6 MB of memory, to standard LocalTalk and optional EtherTalk. Features which make certain this new generation in laser printing is ready-made just for you.



Faster printing of complex documents.

The finest print quality in its class. In addition to complete Macintosh compatibility, the LaserJet 4M printer also delivers the finest print quality of any 600 dpi machine available—thanks to

© 1992 Hewlett-Packard Company PE12276 *Suggested U.S. list price.

their very own HP LaserJet.

HP's microfine toner, Resolution Enhancement technology, and an advanced engine expressly engineered for 600 x 600 dpi.

New generation features mean you will lose no time getting your work onto the page. A new RISC processor and 6 MB of standard memory accelerate formatting and I/O speeds, so complex PostScript language and graphics files are rendered faster and more clearly than ever before.

6 MB of memory built in.

Greater flexibility.
But this wouldn't be an HP-caliber breakthrough if the innovations weren't across the board. That's why, even though the new generation LaserJet 4M printer is built for the Macintosh, it will perform for DOS and Windows users as well... automatically. Automatic language switching (between PCL 5 and PostScript) and three hot I/O ports (serial, parallel, and LocalTalk) make sure users are able to share the printer simultaneously. Without waiting.

Also, because of the LaserJet 4M printer's two integrated paper trays (total capacity 350 sheets) and optional 500-sheet tray and power envelope feeder, you will save time, avoid paper-handling hassles, and gain flexibility.

HP quality and reliability.
The new generation LaserJet 4M printer lets you enjoy the one particular no other Macintosh laser printer can offer—the renowned quality and reliability which comes with owning an HP peripheral. Not to mention our outstanding customer support, where information about how to get the most from your printer is never more than a phone call away.

Increased paper handling.

Four times the dots for better resolution.

Surprisingly affordable.
Perhaps the most remarkable attribute of the new LaserJet 4M printer is the price—$2,999.*
A breakthrough in its own right. So call **1-800-LASERJET (1-800-527-3753), Ext. 7135** to receive a print sample** and comparison disk to see the quality for yourself.† Or visit your nearest authorized HP dealer and see the printer built to add some polish to your Apple.

HEWLETT PACKARD

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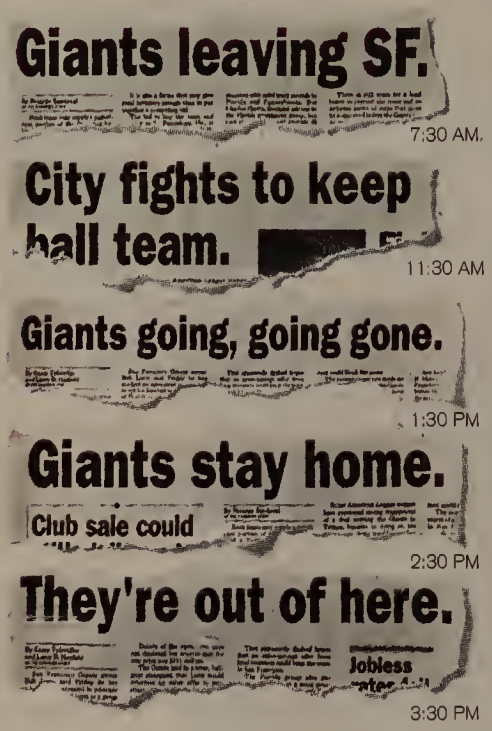
The Examiner cranks out five editions every day. With deadlines ranging from a merely frantic three hours, to a maddening, ulcer-inducing 40 minutes.

Pretty impressive. But what's really remarkable is that they put them all out in color. Thanks to Radius.



ROCKET SPEED HELPS THE EXAMINER PUT OUT FIVE COLOR EDITIONS A DAY. BY THE LOOKS OF THINGS, THEY NEED IT.

How do they do it? Chris Gulker, Director of Development at the Examiner, explains. "We have to work fast." An understatement. "And Rockets have given us the speed we need to really make doing this kind of intensive color work feasible on a desktop system.

IT'S BEEN QUITE A DECADE. THE EXAMINER CAPTURED IT ALL IN RADIUS 24-BIT COLOR.

"Radius' Color Matching System represents another major breakthrough for us in terms of hitting really tight deadlines. Rather than going through the whole rigamarole of waiting for proofs then making all the necessary adjustments, we now have complete confidence that what we see on the monitor really is what we'll get in print.

"With this high level of comfort in the color on our screens, we've basically been able to turn our journalists into color separators. Which means we save in terms of both time and personnel.

"We've also done a lot with video frame grabbing. During the Gulf War, for example, the best images were coming from CNN. Using Radius products, we could put TV shots in the paper that were still of a very high quality."

"WE CAN GET A COLOR PICTURE FROM THE PHOTOGRAPHER'S CAMERA TO THE PRESSES IN THE SPACE OF 40 MINUTES."

A recreation of the San Francisco Examiner's "Hellfire" coverage.

On any given day, you can see six Rocket-equipped Mac IIci's and cx's with

W E M A K E O R D I N A R Y C O M P U T E R S

shing system ry it's making two hours.

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large Radius displays working fast and furious. And, of course, each one comes loaded with Radius 24-bit color.

Satisfied though they may be, the Examiner sees better days ahead. "We're hoping to get set up with RocketShare as soon as possible. That way, while we're waiting for color to separate in the background, we can work on layout and photo editing on the screen. It's going to make life around here a lot easier."

Of course, you don't have to put out a multiple-edition city paper or work under crushing deadline pressure to appreciate the power of our color publishing system. You just have to want to do a better color job faster.

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You'll see it's really quite a story.

D O E X T R A O R D I N A R Y T H I N G S

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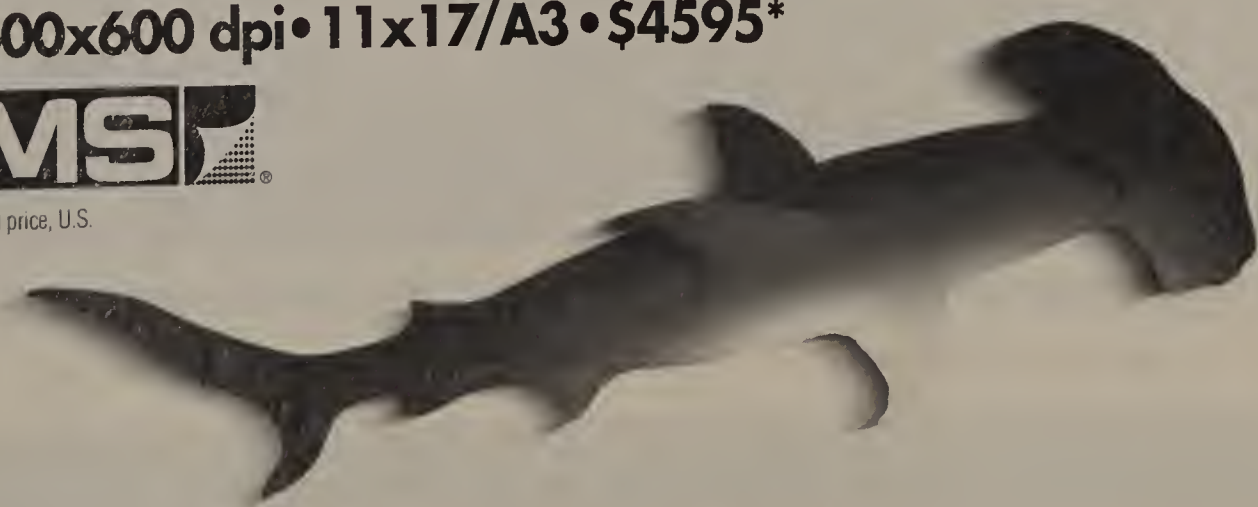

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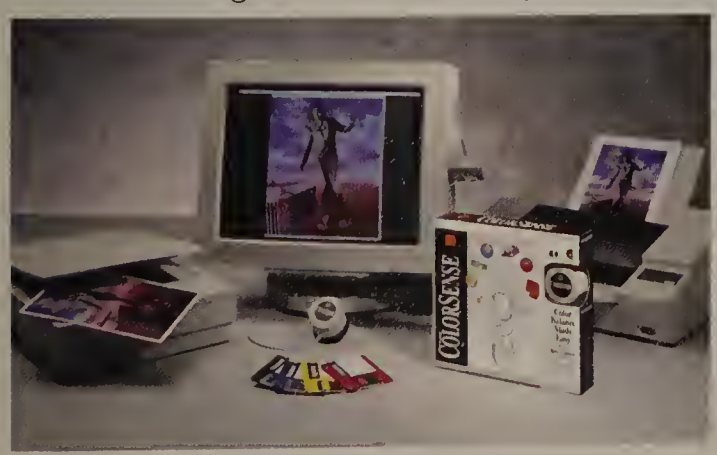

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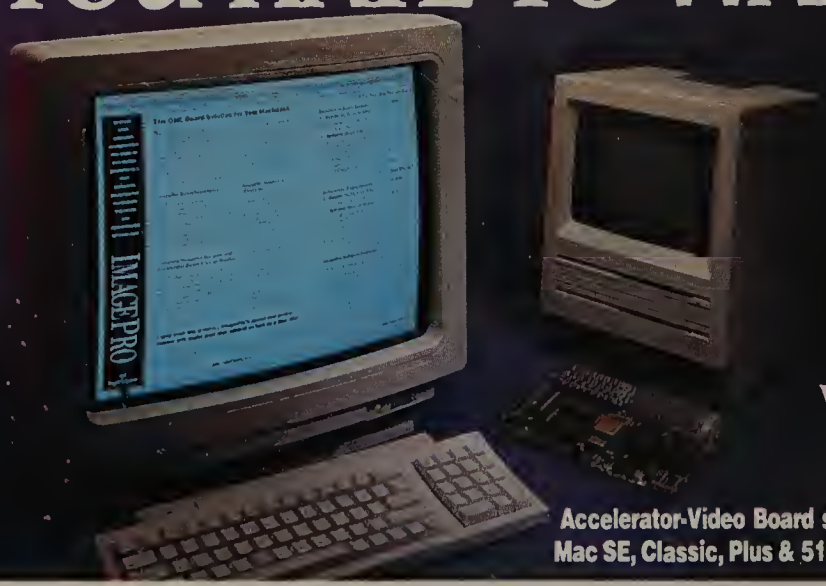

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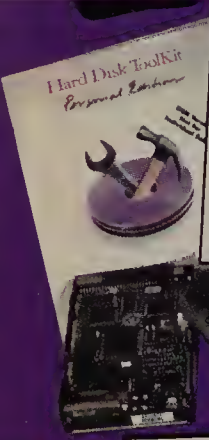

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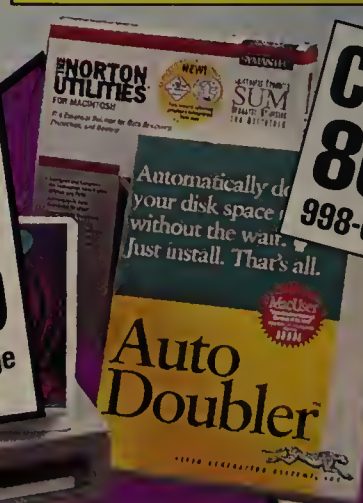

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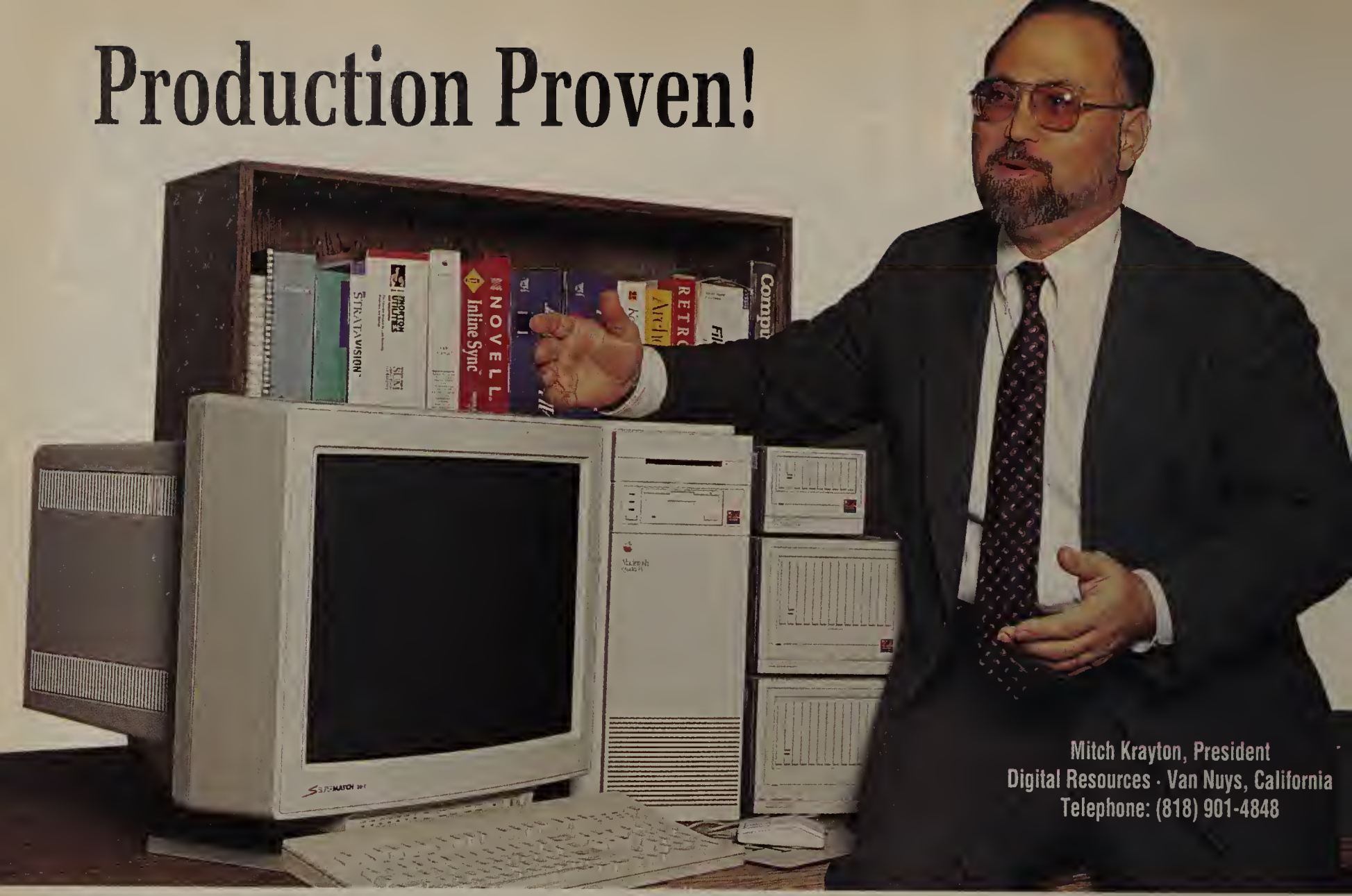

Real World Tests Show MicroNet's Raven·040 Disk Array Continues as the Performance Winner!

Mitch Krayton, President of Digital Resources, knows that to compete in the real world of graphics and pre-press, he has to sell the best performing, and most cost effective systems to his clients.

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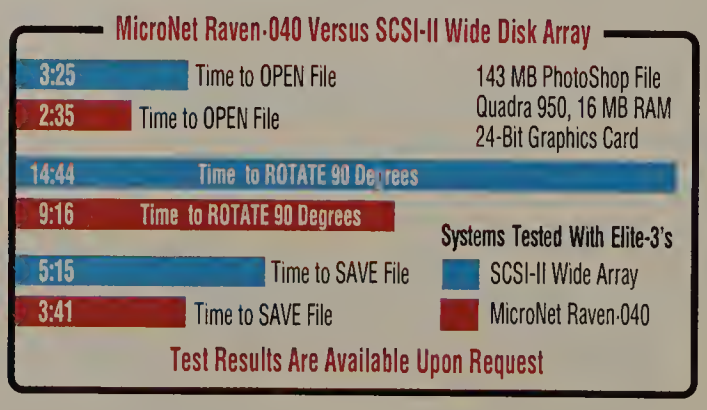
In head-to-head competition MicroNet's Raven·040 disk array proved its reputation as the winner of the MacUser Eddy Award for Best Storage Product of 1991.



"We found that the Raven·040 outperformed a similar capacity SCSI-II Wide Disk Array by at least one-third in real world tests. The Raven·040 was directly bootable out of the box, requiring no special INITs or mounting software.

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Circle 139 on reader service card

MacBulletin

LATE-BREAKING NEWS

Apple's New Internet Router: Apple has announced an upgrade to its software-only router; the upgrade uses a new technology called AppleTalk Update-based Routing Protocol (AURP). AURP reduces network traffic by broadcasting its address lists only when a change occurs, instead of on a regular basis. The Apple Internet Router can tunnel messages through non-AppleTalk networks including IPX, TCP/IP, and dial-up lines by encapsulating AppleTalk packets inside packets of whatever internet they travel across. The Apple Internet Router is $499 per network for the base product, and an additional $499 for TCP/IP support and $1299 for X.25 support.

WordPerfect Acquires BeagleWorks: WordPerfect (801/225-5000) has acquired the integrated package BeagleWorks. WordPerfect will change the product's name to WordPerfect Works, and plans to release version 1.2, a minor upgrade and bug-fix.

Apple, AOL Agree at Last: Apple and America Online have announced a strategic agreement that will give Apple access to America Online's technology for use in future versions of Apple's private E-mail system, AppleLink. Apple is likely to make an improved AppleLink available to purchasers of its future hand-held computers. Ironically, America Online was originally developed to be a public version of AppleLink, but Apple backed out of the deal shortly before the system went up.

Down and Out: Outbound Systems, whose lightweight Mac-based portable computers beat Apple's PowerBooks to the market by three months, has essentially ceased operations. Outbound stopped making its Notebook Systems in December, and laid off most of its employees. A spokesperson for the Boulder, Colorado, firm says it will continue to service its portables until it arranges for another company to take over service.

Top Apple Exec Goes to Microsoft: Roger Heinen, Apple senior vice president and general manager of the crucial Macintosh Software Architecture Division, has resigned to join Apple's rival system software vendor Microsoft Corporation. Heinen, who was privy to all Apple's operating-system plans, will have the title of vice president of database and development tools.

DuoMate Speeds Duos: RasterOps (408/562-4200) has announced DuoMate, a portable docking station that attaches to the back of a PowerBook Duo, accelerates video output, and supports an 8-bit RGB monitor or—depending on the model of DuoMate—an NTSC or PAL television monitor. The $599 docking device can also link to a VCR to make a videotape of a presentation, and it provides an ADB port and a floppy disk drive controller. It should be available in March.

Lightning-Fast ColorSync: At press time, RasterOps said it would demonstrate at Macworld Expo in January a technology that can speed Apple's new ColorSync color-management software by up to 18,000 times. That means a 40MB image would be color-corrected instantly instead of taking about four minutes, the company said. A product based on the ASIC chip should be available in late spring this year. m

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Which PowerBook?

BY ADRIAN MELLO

THE PROBLEM WITH HAVING a lot of good choices is deciding among them. Lately, I've noticed a special kind of suffering that is afflicting potential PowerBook owners. With the introduction of five compelling PowerBook models, buyers are struggling over which to get. I wanted to figure out which model I wanted myself, so I spent time living with each model to discover their strengths and weaknesses. Here's what I found out.

The key to choosing a PowerBook is deciding between one of the three tried-and-true "traditional" PowerBook models and one of the slim PowerBook Duos (the 210 and 230, along with a small solar system of accessories). The traditional PowerBook design is heavier (6.8 pounds) and can have everything you're likely to need built in except an AC power adapter. The PowerBook Duos are slim and light (4.2 pounds) and fit in a stationary docking system. Apple's Duo Dock docking station provides access to a floating-point chip and has most of the advantages of a desktop computer, including two slots, extra video memory, and a bay for an internal hard drive (in addition to the Duo's own internal drive). At first glance, the choice appears to be between the convenience of an all-in-one design and the flexibility of being able to add to a basic system that's also lighter in weight.

Now that I've given you a rational overview, please indulge me while I explore the emotional aspects of the new PowerBooks. Like me, you may have to get the "cool-toys response" out of your system before you can make the right decision. Let's start with the coolest computer I've ever seen—the PowerBook Duo.

The Dynamic Duo versus the Active Matrix

IF BATMAN HAD A COMPUTER, IT would be a PowerBook Duo. I can see him bursting into the Bat Cave—a few quick strides and he's seated at his electronic command post facing his Duo Dock. With a touch of a button, the robotic whir of the PowerLatch system ejects the Duo. He slaps the MiniDock onto the back of the notebook and thrusts it into an armored black carrying case marked with the Batman logo. He briskly clips the AC adapter onto his utility belt. Batman then clips the floppy adapter in place, carefully keeping it separate from the suspiciously similar-looking batarang.

Hey, what's good enough for Batman is good enough for me. I was captivated by the Duo. But the first time I used the PowerBook 180, it dragged me back toward using a conventional PowerBook. Until you use an active matrix screen like those of the 170 and 180 and compare it with a passive matrix screen, you can't appreciate the difference: the 180's screen is far superior to the Duo's screen. The real surprise is how much nicer the 180's screen is than the 170's. They are both active matrix, but the 180 adds gray scale and a shadow mask. The result is a sharper, higher-contrast image that makes the 180's screen much more appealing.

The Duo Dilemma

ALL RIGHT. TIME TO COME BACK DOWN to earth. After all, we're talking a lot of money, now that we're choosing between a fully loaded PowerBook Duo and a PowerBook 180. These products list for around $4000, and that's if you can get your hands on the 180, which is in tremendous demand (and short supply, due to screen-manufacturing problems). That's the beauty of rationality—it can help you decide that you don't want what you really want when you're not sure you can have it anyway.

Now let's analyze the joy out of the first object of my infatuation—the PowerBook Duo. After living with a Duo system for a while, I discovered that it has a problem —too many pieces (of course, this is precisely why I liked it in the first place!). Every time I went somewhere I had to think about which pieces to bring. What if I want to transfer files to another computer? Should I bring the SCSI Disk Adapter or a couple of PhoneNet connectors? But I might buy a new software package on the road and want to install it. Better bring the floppy drive. Oh yeah, don't forget the floppy adapter that goes with it. I might want to hook up to that color monitor in a colleague's office and work on my presentation in color. Better bring the MiniDock. But then I don't need the Duo Floppy Adapter. Take that out and put it back. After all, I want to reduce weight and save room in the carrying case. But I can forget about both of those goals if I bring along a floppy drive or a MiniDock.

Which PowerBook would Batman buy?

The trick with a Duo system is that to really save the 2 pounds, you have to decide that you can live without a floppy drive and an external monitor most of the time. Otherwise you will carry around a floppy drive and an adapter or MiniDock and about as much weight as a conventional PowerBook. If you forgo a floppy drive you have to use a pair of PhoneNet adapters or the HDI-30 SCSI System Cable to load new software or transfer data files. And that means you have to have access to someone else's computer, which means you aren't nearly as independent. If you want to back up your hard drive and there's no other computer handy, you can do it remotely, but you have to have a computer or server set up at another location so that you can dial in and download a file. You may not like carrying a floppy drive, but you can be caught in a bind without one.

A Strength of Tradition

IF CONVENIENCE IS THE NAME OF THE game, the traditional PowerBook design largely wins. You don't need to think about which pieces to bring; you don't have to unpack and repack them on the road or worry about losing them; and you won't forget to bring that one crucial piece that would have let you do the job. Also, once you cable a floppy drive or other component to a Duo, you're making a portable PowerBook look uncomfortably similar to an immovable desktop machine with its sundry attachments.

The chief convenience of a Duo is not the unlikely weight savings, but the way it configures your system when rejoined to a Duo Dock. The PowerBook 210 or 230 activates the dock's math chip and

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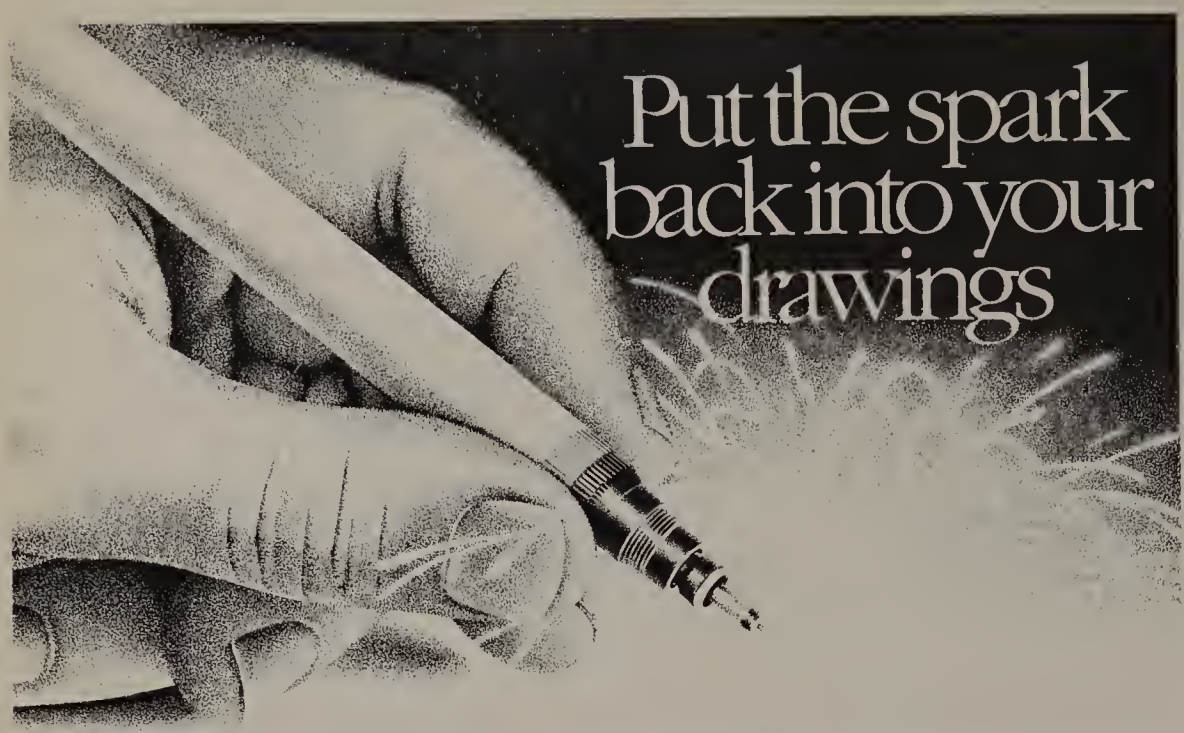

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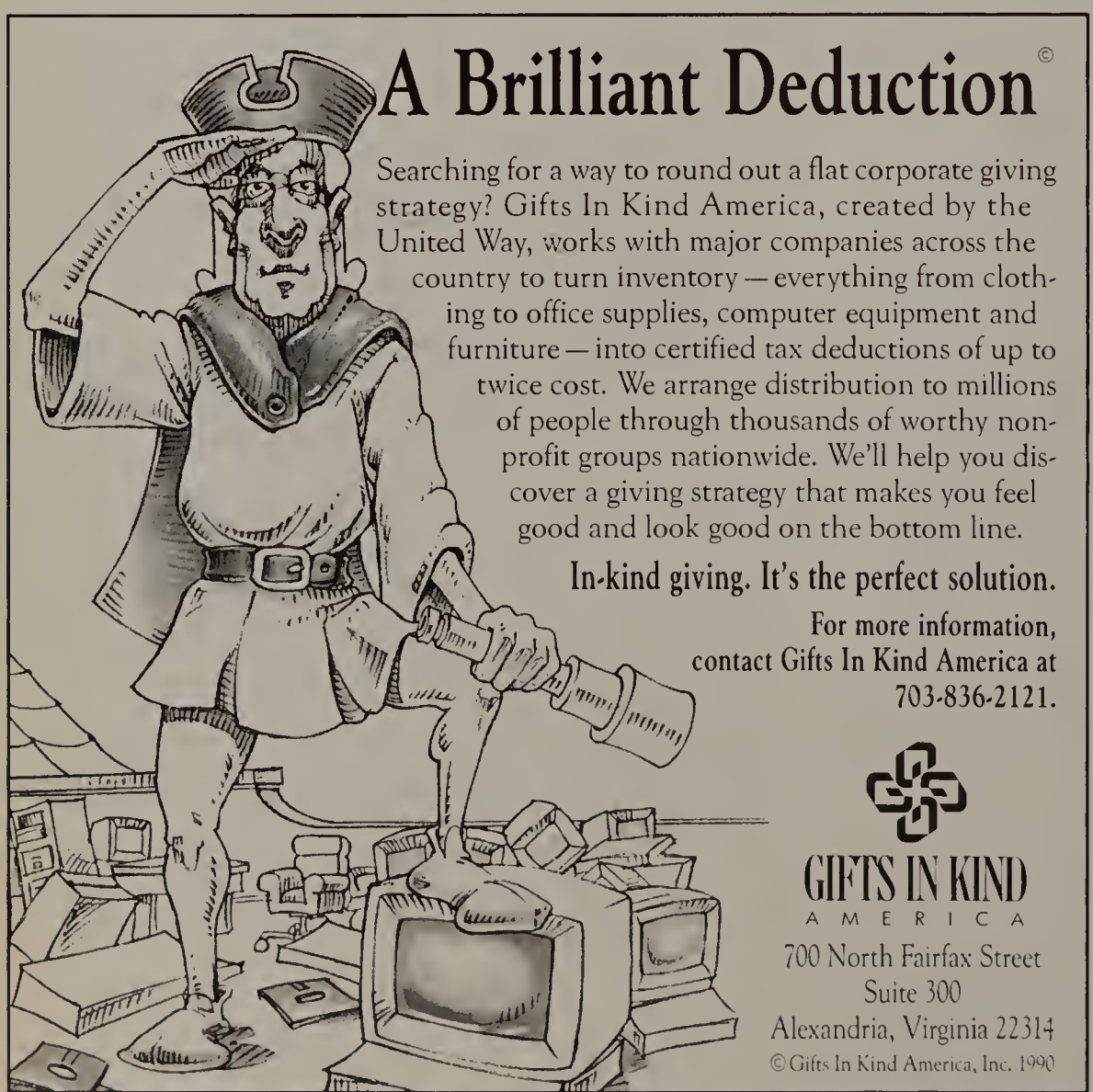

video RAM expansion options, switches from LocalTalk to Ethernet (if it's installed), and temporarily disables any power-saving options. But I doubt that for most users this convenience outweighs the inconvenience of not having a truly complete system with a Duo. After all, if you do want both a PowerBook and a desktop system you could simply transfer the data by floppy or by SCSI cable.

The PowerBook Duos work best for people who commute between stationary computers, most likely between home and office or between two offices. The key is that there is another computer at each end. Better yet, there are the necessary Duo accessories at each end. At work you have a Duo Dock set up as a desktop system. At home you have a MiniDock, an AC adapter, a color monitor, and a floppy drive. You toss your Duo into a briefcase and take it home. You don't have to worry about the pieces you bring. A Duo might also be a good choice for people who regularly travel between meetings and take notes there.

Choosing a Winner

NEVERTHELESS, MOST PEOPLE ARE better off with a traditional PowerBook. So which one—the 145, the 160, or the 180? If money is no object, the 180 is the PowerBook of choice. If you can afford one and don't mind waiting in line to get it, you won't be disappointed. If you plan to regularly work in front of the built-in screen for extended periods of time, the extra $1300 or so premium over the PowerBook 160 is worth it.

Remember, I said *if you can afford it.* Many people aren't willing or able to pay $4000 or more for a notebook computer. So for most people I recommend the PowerBook 160. For about $300 more than the PowerBook 145, the 160 lets you attach an external gray-scale or color monitor. This means you can run color presentations from your PowerBook, and you can bypass the passive matrix screen when you have access to a real monitor. If the 145 were $700 to $800 less than the 160 it might make more sense.

All in all, the choice for most users is between the PowerBook 160 and the PowerBook 180. The 180 wins if you just won't be near a monitor that often and you work in front of the screen for long periods of time. As much as I love the 180, I give the nod to the 160 because now that you can connect it to an external monitor its passive matrix screen is less limiting. Rationally, the 160 makes the most sense for most people. Of course, that doesn't stop me from wishing I had a Duo system—just for the fun of it. Hmm. Maybe Apple should offer a utility belt . . . m

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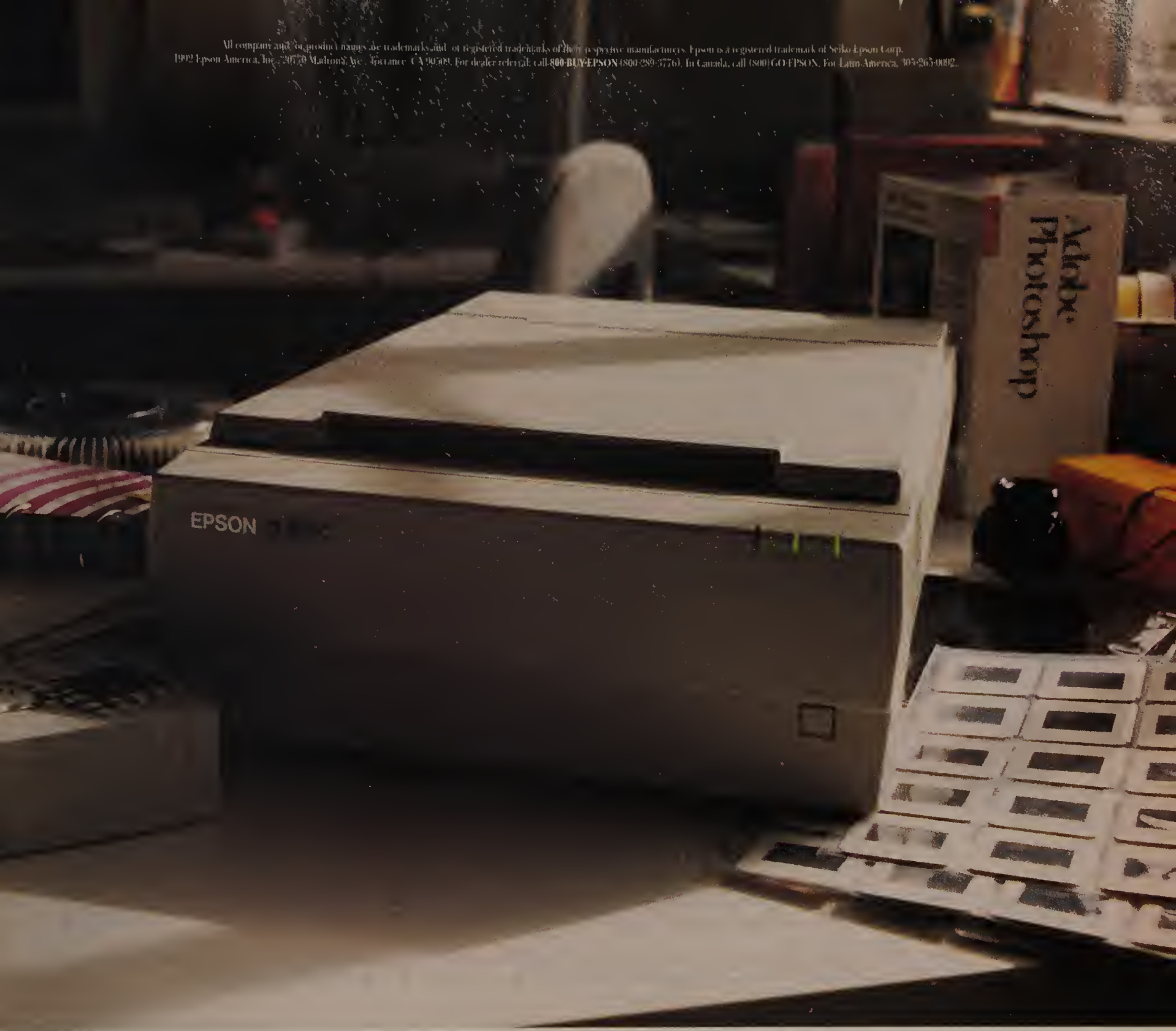

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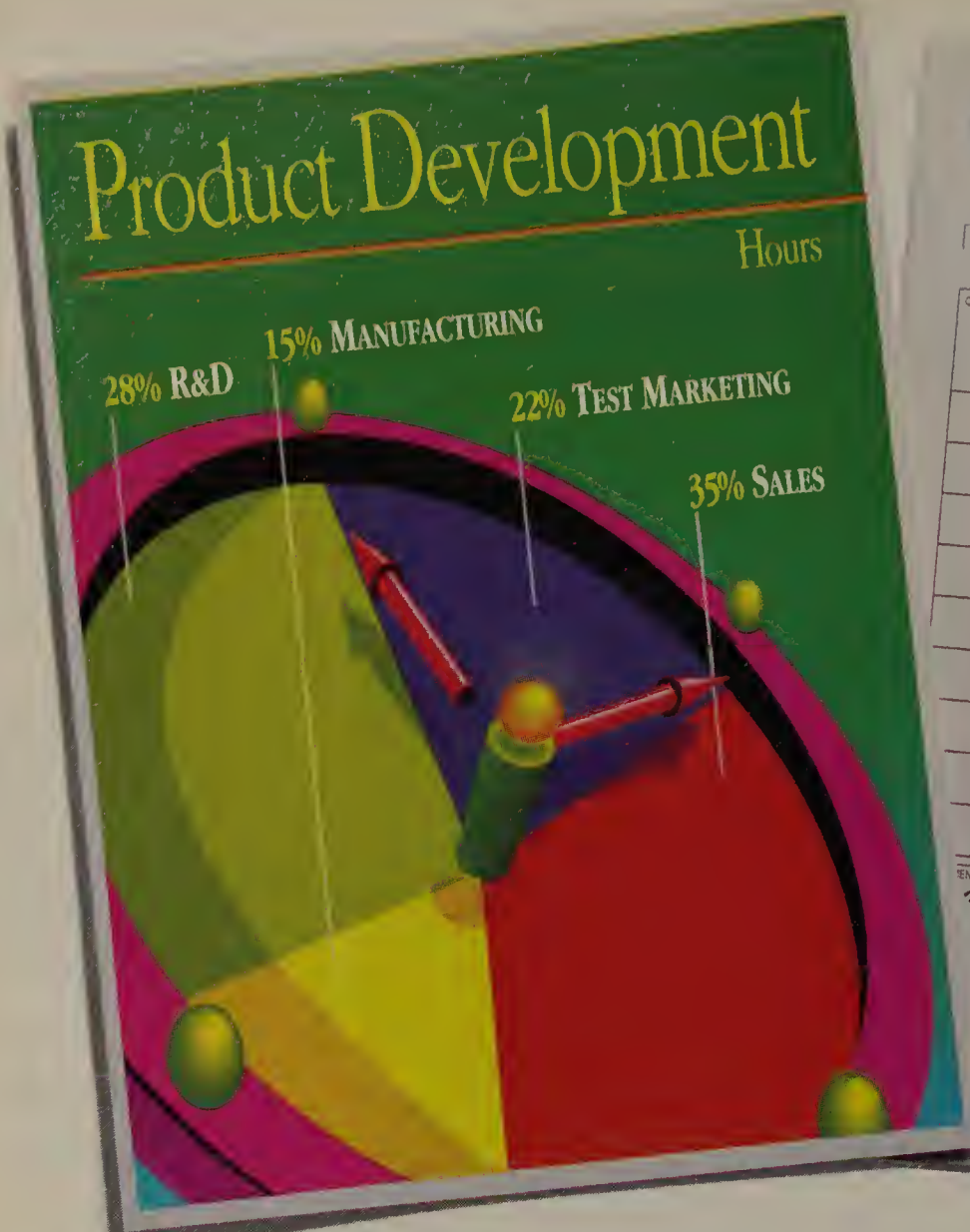

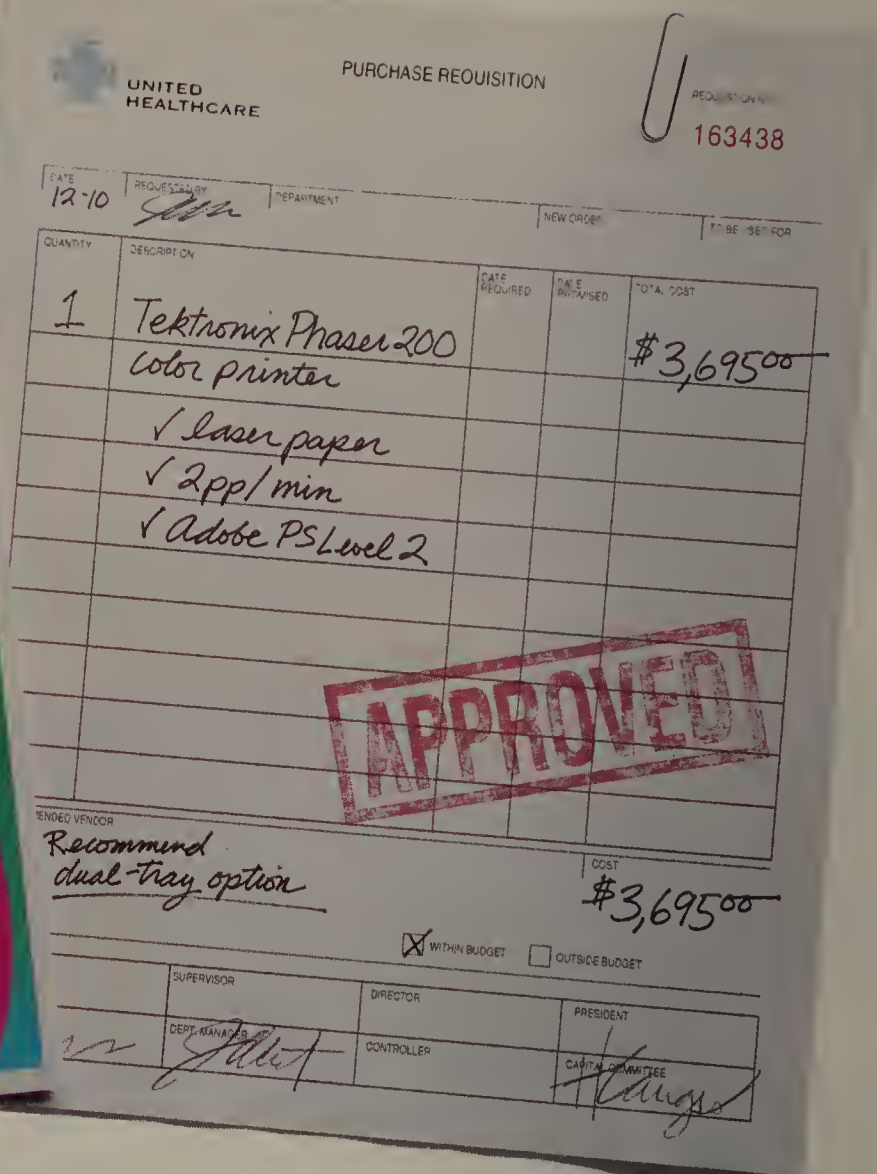

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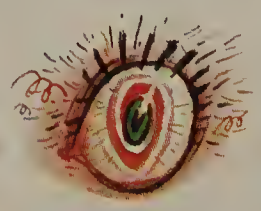

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Circle 143 on reader service card

Letters

MARCH 1993

IIvx Just Putters

ALL RIGHT, GET ON YOUR HORSES and figure this one out, quick. I've been reading the reviews on the new Mac IIvx computer from Apple, and most of what I read makes my mouth water ("The Macintosh IIvx," December 1992). But I'm puzzled by something. Why is it that a new computer with a built-in math coprocessor that runs 28 percent faster than a Mac IIci, still runs slower than or only as fast as the Mac IIci? How about an answer on this one?

Craig Peterson
Santa Monica, California

A bottleneck is the reason behind the slower speed. According to one source, even though the CPU (the central processing unit, or the brain of the computer) of the IIvx is faster than the CPU of the IIci, the IIvx's ADB transceiver (Apple Desktop Bus transmitter and receiver) is only half as fast as the IIvx's CPU, which means that the CPU is often left waiting to receive or send processed information. It's sort of like dictating a message at 30 words per minute to someone who can write only 15 words per minute. You have to stop and wait for the message taker to catch up periodically.—Ed.

CHARLES SEITER SAYS, "FOR YEARS the AppleColor Monitor has been called 13-inch, an honest reference to the true diagonal size of the image area." Wrong! The actual image area is 11½ inches. The exposed glass area of the tube is a tad less than 13 inches. Seiter goes on, "This new standard Apple monitor, with the same picture dimensions as the old one, has been proudly redesignated as a 14-inch monitor." Whose side is he on?

The government passed a law many years ago requiring an honest diagonal measurement of TV screens. How about getting a law requiring computer monitor makers to measure screens the same way, relative to actual image area and not the glass area?

Richard MacLean
Crofton, Maryland

No Deal at All

I FOUND THE ARTICLE "THE UPgrade Express" very good (*Conspicuous Consumer*, December 1992). I was particularly interested in the quote from Judy Chase, Microsoft Word product manager, about her "deal of the century" (Word 5.0 owners will get 5.1 for less than $20).

What deal? I received my upgrade offer from Microsoft with a price of $129. On the back of the card it indicated if I bought Word 5.0 after October 1, then it would only cost $5 for shipping. I am sure you printed what you were told, but it is indicative of the credibility of some of the Microsoft people. In my case, I upgraded to 5.0 in January and when I consider the upgrade cost, I am less than satisfied. Word has some excellent features, but it is also flawed. Is there an explanation why 5.1 came out such a short time after 5.0?

William L. Kriegs
Racine, Wisconsin

It's no misprint—Microsoft is offering registered Word 5.0 owners an upgrade to 5.1 for $19.95, which includes shipping and handling. If you are a registered 5.0 owner and receive the wrong offer, call Microsoft's Customer Service number at 800/426-9000.—Ed.

Miracle Connection

I'M WRITING ABOUT "HARD DRIVE Rx" in the December 1992 issue. The "SCSI Do's and Don'ts" chart on page 215 states that "the last device should have an external termination connector." Did something get lost in the editing or does Mr. Eckhardt really mean it? I have an external hard drive with internal termination; am I supposed to go out and buy an external terminator for it? Have I used it successfully for two years with just luck?

While I do have a glint of amusement in my eye, SCSI can be weird

continues

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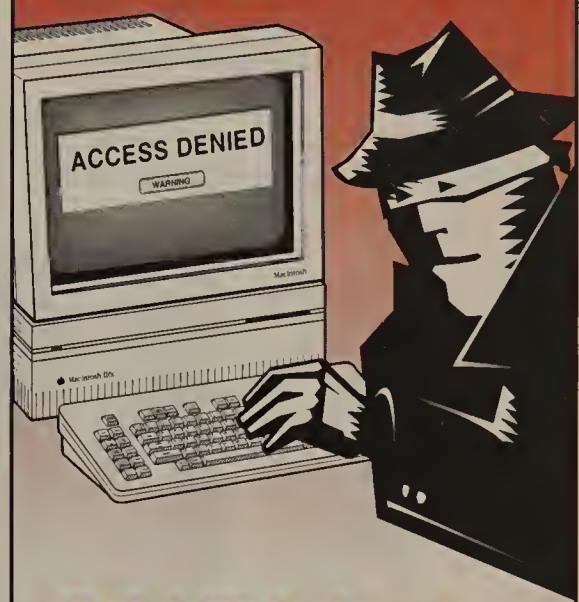

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Alex Podressoff
Tempe, Arizona

The last device needs to be terminated, but termination can be either internal or external.—Ed.

Inconsistently Reviewed

I PERCEIVE A GREAT DEAL OF INCONsistency among identically rated products. Specifically I am referring to the three stars accorded both Omnis 7 1.1 and Kodak Renaissance in December 1992 *Reviews*. In the Omnis review the pros and cons box sets the tone, with many pros and only one con, "Not for neophytes," which is not a con at all, since I can't think of any relational database that is particularly suitable for neophytes, though Helix is no doubt easier. Contrast this with the review of Kodak Renaissance that has several not-inconsequential cons, a review laden with details of its shortcomings. Yet both programs get exactly the same, three-star, rating!

I sincerely request you add half-stars to your rating system and most especially that you set forth specific guidelines on how reviewers are to use the system whether you stick with the current one or not. Then have someone other than the reviewer read through the reviews to catch inconsistent ratings in the future.

Andrew Ruff
Palo Alto, California

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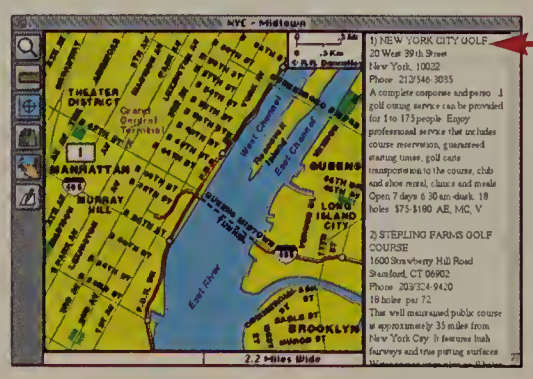

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Grade Wars

I WAS DISAPPOINTED BY THE SElection of Grade Machine 5.0 over Making the Grade 2.0 in the December 1992 *Reviews*. I suspect that George Beekman and Kay Stephens have never been overworked, underpaid classroom teachers. Nor, I presume, have they ever been challenged to select a grading program for a number of computer-shy educators who

continues

CORRECTIONS

"How to Unlock the Hidden Storage on Your Hard Drive" (PowerBook Notes, *February 1993) warned that readers should back up their hard drives in case anything went wrong. The article should have noted that readers* must *back up their hard drives and verify that the backups are functional before following the procedure, which will destroy any data on the hard drive. In Step 3, after users see the message "Partitioning was successful," select Done, and then Quit, they must restart the Macintosh using the Disk Tools System. Then users should copy the System back onto their hard drive, and restore their backup files.*

"Gauging Video Speed" ("24-Bit Color Graphics," February 1993) didn't reflect the actual performance of RasterOps' Paintboard Li. With the appropriate software, the Paintboard Li's performance is nearly identical to that of RasterOps' 24XLi board. Retesting of the boards revealed significantly better performance than was originally indicated, with the following results: vertical scroll 81.4 seconds, horizontal scroll 71.2 seconds, and page scroll 15.3 seconds.

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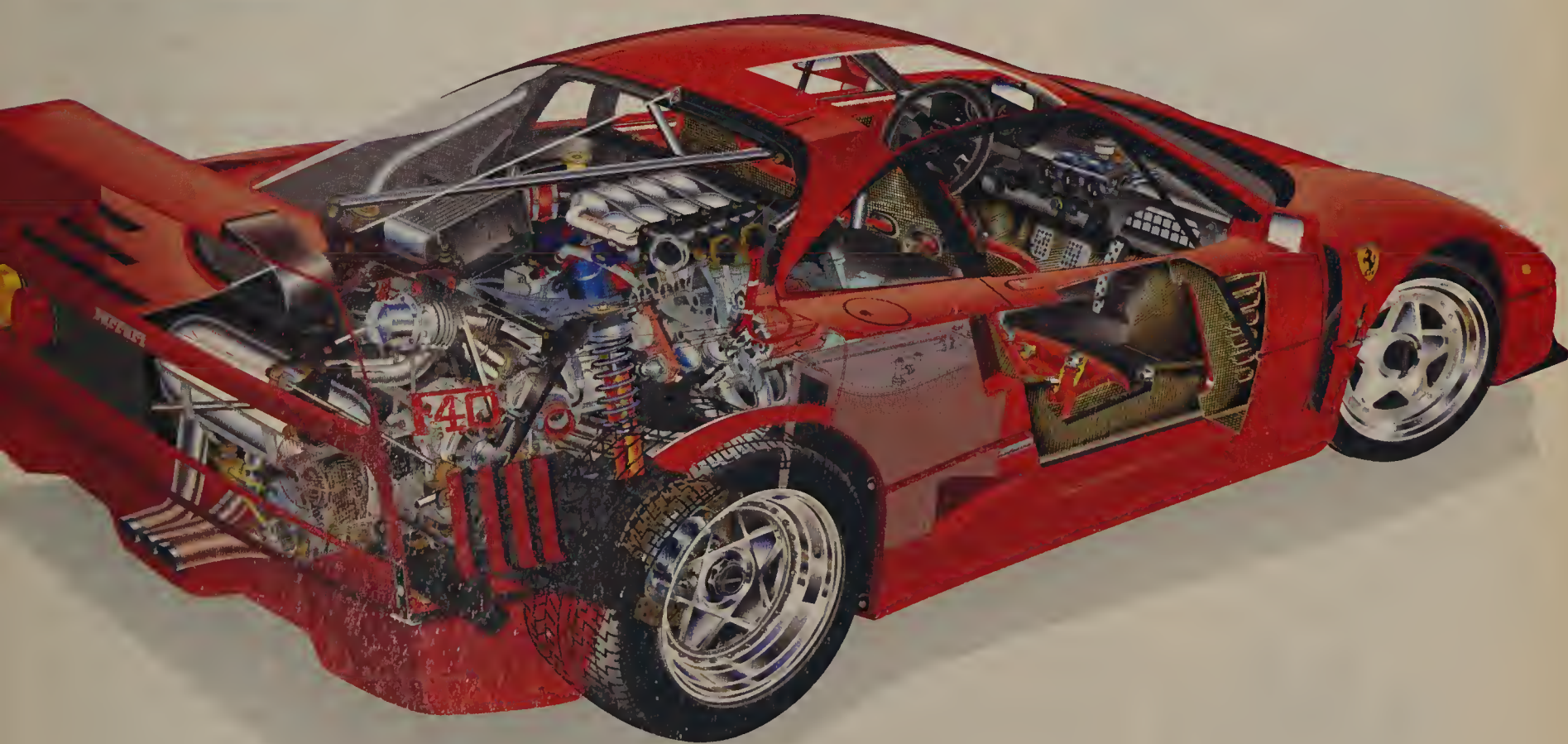
DEC, 1991



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not only need, but require, the friendly interface and, "chatty" documentation that Making the Grade offers. As for the comment that the number of reports offered may appear to be overkill, it is obvious that your reviewers have never been in the position of having ten minutes to prepare for a conference with a concerned, or irate, parent. I found the reports created by Making the Grade a constant reassurance to both students and parents.

Sandra Ewanowski
Lilburn, Georgia

I CONCUR WITH MOST OF WHAT YOU said about Grade Machine 5.0. The programmers at Misty City Software are in tune with teachers' needs and seem to always have new and improved versions in the wings.

I'd like to underscore a feature you touched on: the incredible flexibility of the entire program. All the gradebook reports, attendance reports, and individual student reports can be tailored, it seems, indefinitely. I noticed you mentioned a pro of Making the Grade 2.0 was its ability to print in Spanish. I have been able to tailor Grade Machine reports using style sheets to read almost completely in Spanish for three years.

Diane Berthoin-Hernandez
Castroville, California

The Classroom Attendance module for Misty City's Grade Machine is now shipping. It was not at the time of our December issue.—Ed.

Another Look at Fonts

IF I WERE SOMEONE INTERESTED in creating or editing outline fonts, the review of Fontographer 3.5 could have only hindered my quest for accurate information (*Reviews*, November 1992). Instead, I am an experienced user of Fontographer and its competitor FontStudio. From my perspective, the reviewer did not understand the program and its relation to making font outlines. Nor do I believe the reviewer understood the significance of font formats or the discipline of working with letterforms. For instance, the statement "As with any PostScript draw program, you can control fill patterns, line weight, the way each line ends, and the way strokes meet" is truly meaningless. First, there are no patterns in Fontographer, only tints; second, the tints and strokes can only be used with the Type 3 font format, which is largely irrelevant.

I also cannot fathom why the renaming of a font is so hard for your reviewer. And then the reviewer lumps interpolation under the concept of adding control to font editing. Anyone who has used interpolation would know that control is not one of the results, though interpolation does add options. Finally, the short discussion of Multiple Master technology must have had the people at Adobe wondering why they even came up with the silly idea.

Tom Davis
Dallas, Texas

Alternative Suggestion

MENUCHOICE BY KERRY CLENdinning, $15 shareware, does the same thing for me as Power Menus on my IIcx running System 7.1 (*Reviews*, December 1992). Not only does it allow submenus for anything in the Apple menu that supports them, but also to mounted volume aliases placed there. It also creates a Recent menu item that tracks the most recently used Apple menu items during a session. MenuChoice doesn't allow fidgeting with font sizes, but that seems a small sacrifice. Just another example of shareware lighting the way.

Patrick Denny
Hawthorne, California

Motion Works Responds

IN READING THE REVIEW OF PROmotion (November 1992), we have found a number of areas in which the review was incorrect.

How is it that the "three-step procedure of opening the host file, selecting the object you want to import, and confirming the object's name" is a "mind-numbingly slow" process? You would be hard-pressed to find any other package that not only provides the import/export flexibility but also the simplicity that is found in Promotion.

The review says "The eyedropper tool works only in the foreground window, preventing you from, say, matching the colors in the current actor to the colors in a prop." Promotion allows you to edit multiple actors and props at the same time. All the user needs to do is open both the actor and prop for editing, select the color in the prop, and use it in the actor. The review also says "When drawing an actor, you can't preview the appearance of a specific frame against its background, denying you a glimpse of the big picture." The image of the actor *is* updated in the animation window if the actor is edited on a frame-by-frame basis.

The opening summary states "No support for QuickTime compression."

continues

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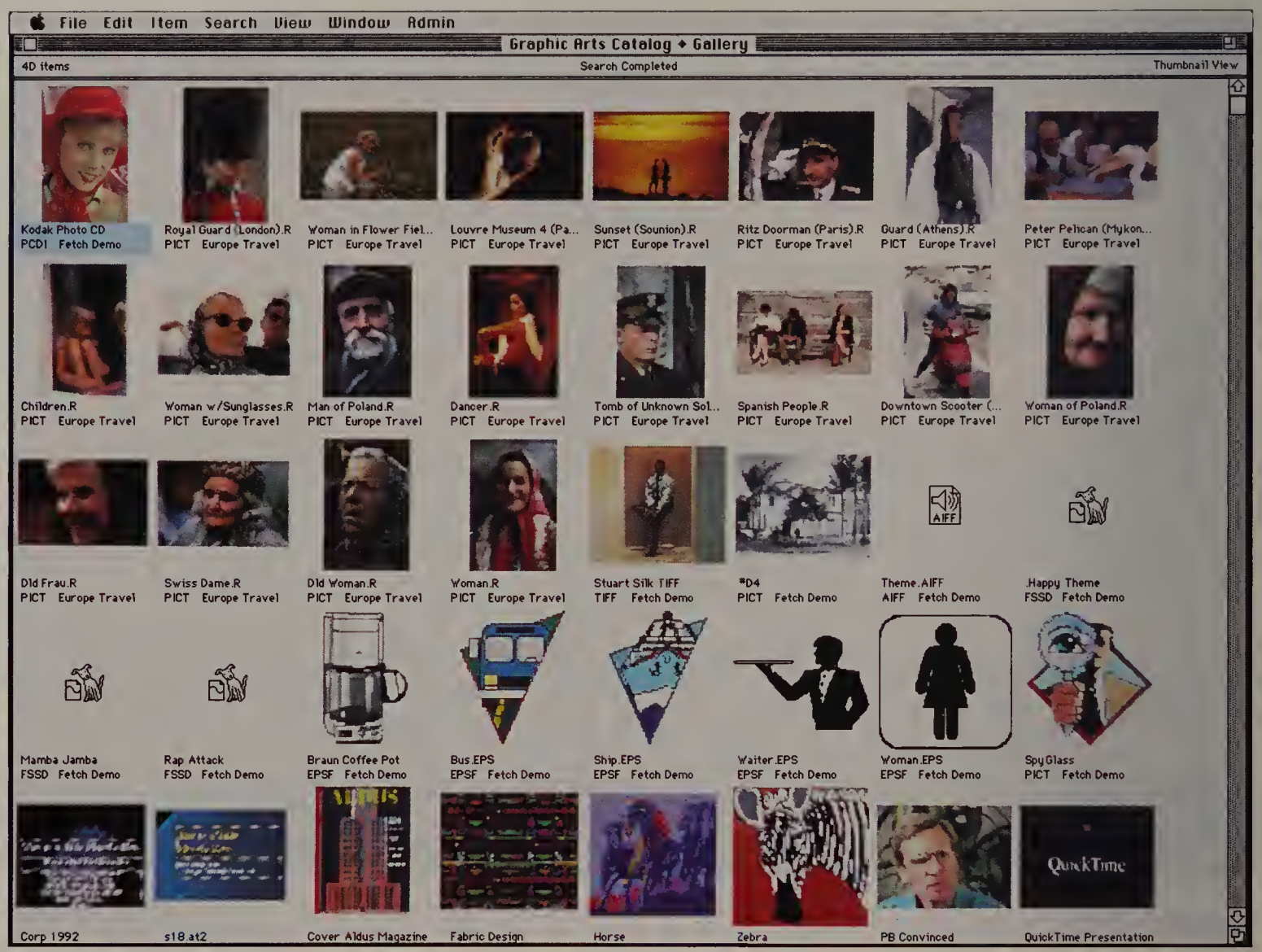

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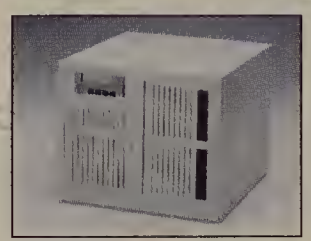

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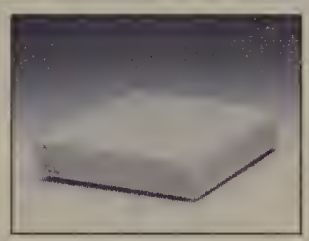

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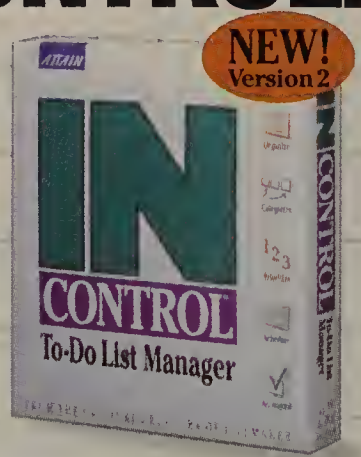

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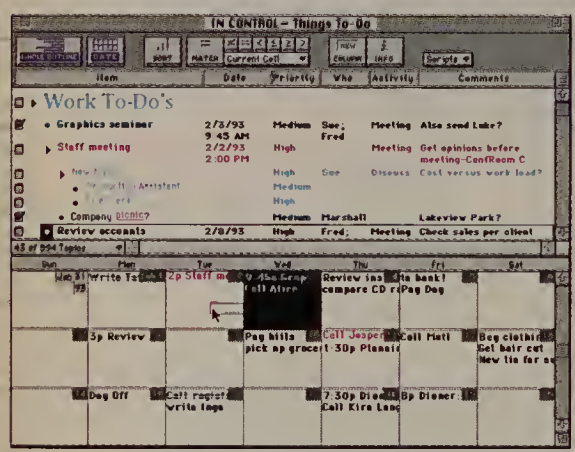

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When exporting to the QuickTime format, Promotion defaults to using the Animation Compressor, which is the compressor Apple recommends when creating animated QuickTime movies.

Rajiv Aggarwal
Vice President, Product Development
Motion Works International
Vancouver, British Columbia, Canada

Stacks and Heaps

LON POOLE'S REPLY TO CURT D. Baker about stack and heap collisions is confusing (*Quick Tips*, December 1992). The short story is that when the Finder launches a program, the system allocates a default amount of memory to that program, which you set up in the Get Info window of a program. This whole chunk of memory represents both the heap and the stack areas the program will use while it is running. Where the heap ends in that chunk of memory, the stack also ends. As Lon Poole said, the stack and the heap "grow toward each other." Actually, they're both in the same chunk. The programmer can internally set the size to which the program's heap can grow until the program runs out of memory.

There are some cases in which a program has sufficient memory but will still crash with the "Stack collision with heap" error. This happens when the programmer didn't have that extra cup of coffee (or Jolt cola) required when he or she was dealing with memory allocation. When a program references an address, such as a variable's address in memory that is no longer valid, and that program tries to write data to this address, the Mac notices that something is wrong and assumes that the "stack" has moved onto the "heap." If increasing the memory partition of the program doesn't solve the problem, then the only thing you can do is wait for an update after having reported the problem to the technical-support people of the program's publisher.

Martin-Gilles Lavoie
Montreal, Quebec, Canada

Want Accounting Jargon

I HAVE SERIOUS DISAGREEMENTS with Jim Heid's *Getting Started* ("Small-Business Accounting," November 1992). He is mistaken when he classifies income as an asset, grouping it with money in the bank and equipment. He is also mistaken when he classifies rent as a liability, grouping it with bank loans and bills. Money in the bank and equipment go in the debit column while income goes in the credit column; bank loans and bills go in the credit column while rent goes in the debit column.

Danny Schlesinger
Caracas, Venezuela

Paying for Answers

IT SEEMS THAT APPLE, AS WELL AS many of the software companies that produce software for the Macintosh computer, has discarded the philosophy that has given the Macintosh such a loyal following. I remember the days when you opened a new software package and spent a few fun hours discovering how to use it. The manual was considered a last resort as well as an admission of defeat. Now, not only are software manuals a must but the user is oftentimes at the mercy of technical support. The final insult comes after hacking your way through the automated phone system and finally reaching a real person who tells you that buying and registering your software is not enough. You must now pay for a technical-service contract.

Zena Mercer
Galveston, Texas

Seeking Mini Mouse

I'VE SEARCHED FAR AND WIDE IN toy stores and found the perfect, textured, glass marble to replace the plastic trackball in my PowerBook 100. But when I'm drawing in FreeHand, the poor machine is reduced to a digital Etch A Sketch. Sure I could use a regular mouse, and drag along a mouse pad and a hardback book to put it on. A second lap is not always available. Is someone out there going to make us one-lappers a micromouse?

Richard Gordon
Winnipeg, Manitoba, Canada

At the November 1992 Comdex show, Appoint, maker of the MousePen, announced a new mouse that is half the size of the Apple mouse and that has a friction trackball allowing it to work at any angle. The product will be called Gulliver and has a suggested retail price of $99. Readers can call 800/448-1184 or 510/463-3003 for more information.—Ed.

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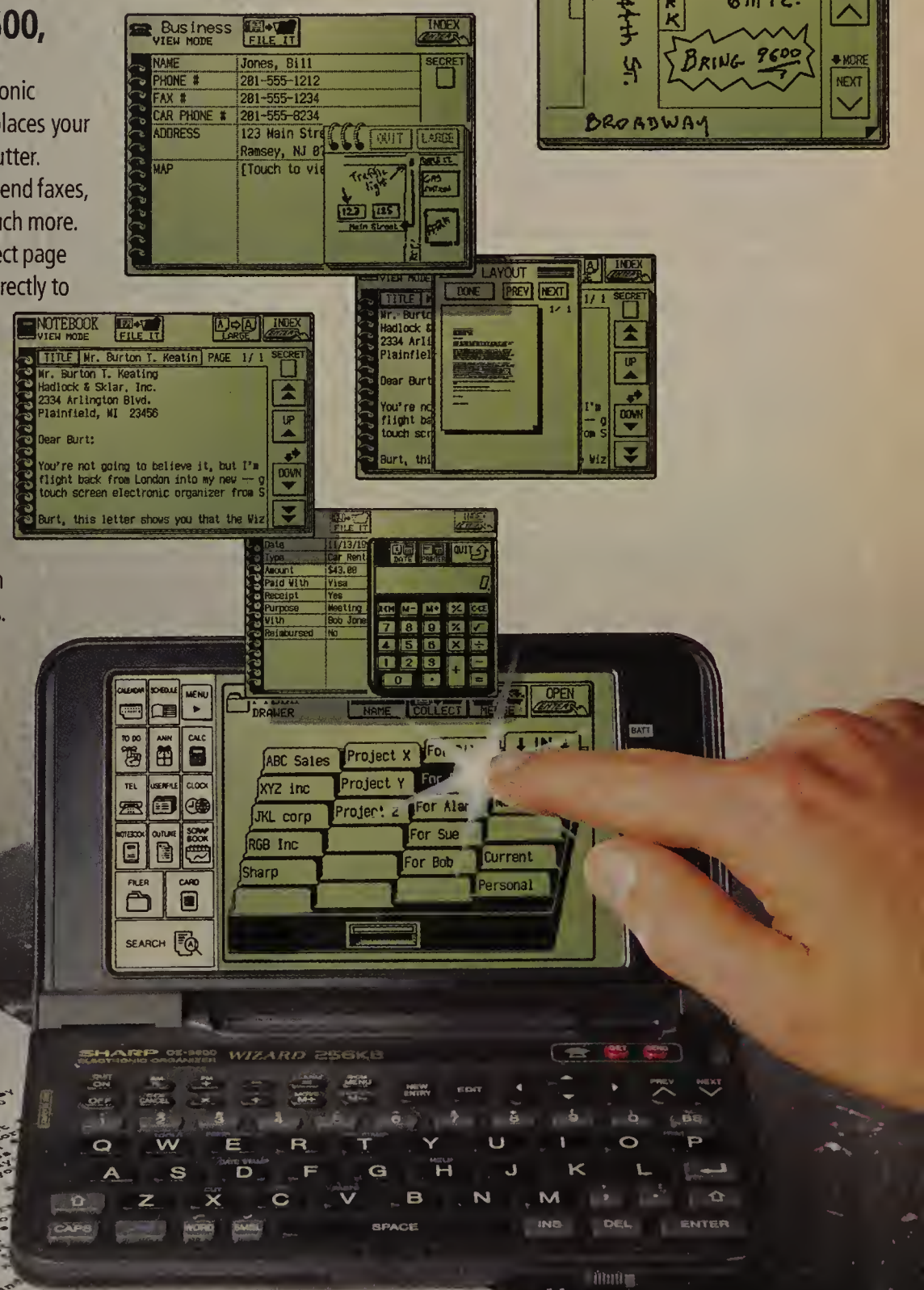

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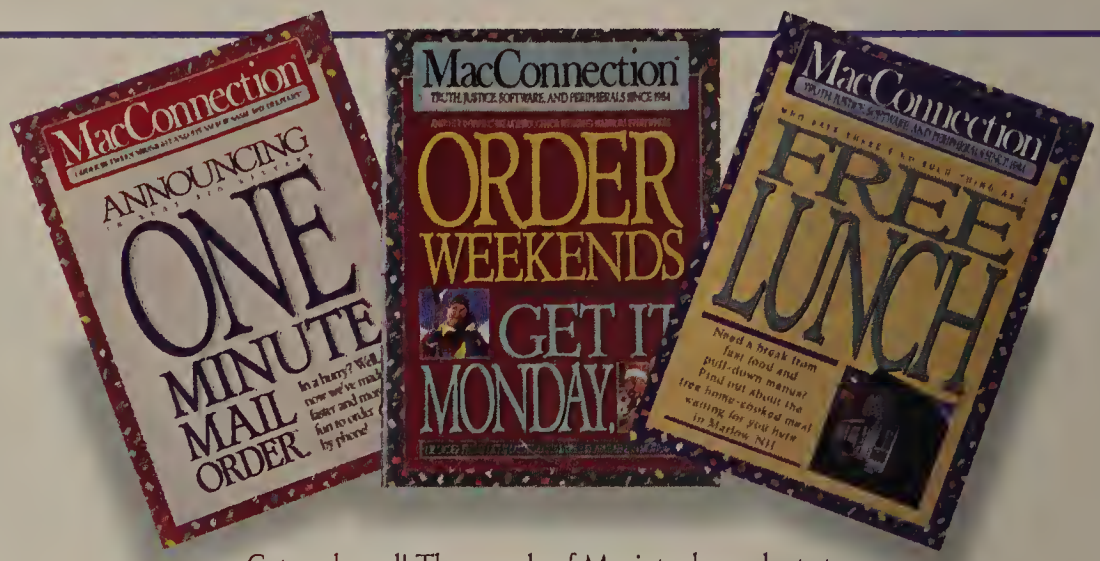

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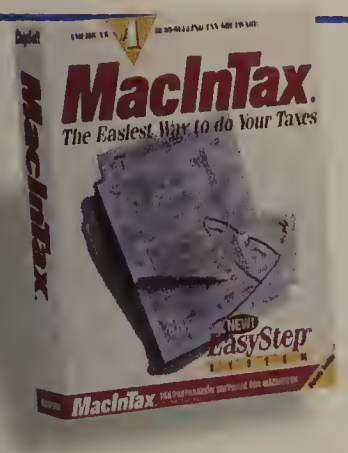

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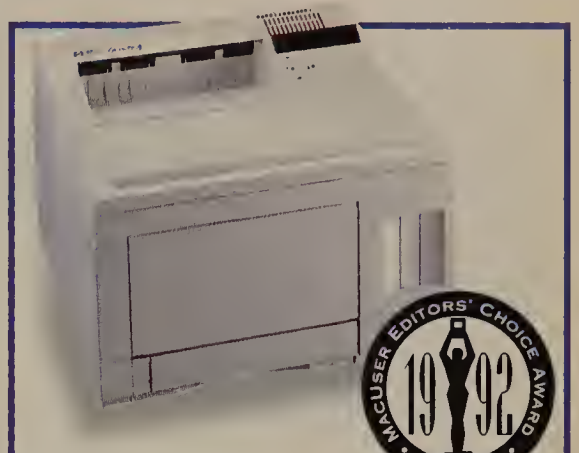

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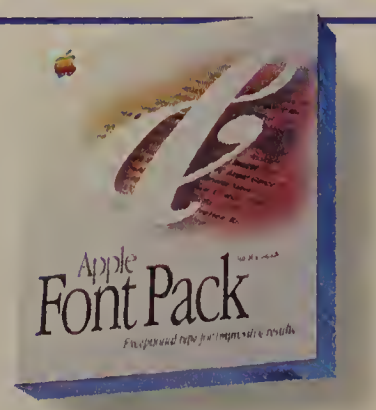

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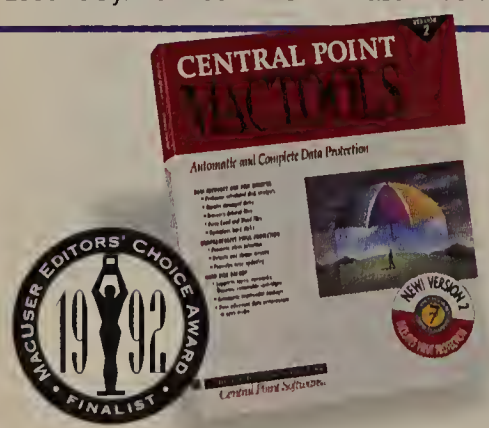

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2565 ❼Project 3.0..... 445. Upgrades ..... call
Postcraft International
2210 ❼Effects Specialist 2.0 ..... 89.
Quark
7612 ❼QuarkXPress 3.2 *(Jan '93)* ..... 549.
★**Specular International ... 30 day MBG**
4962 ❼Infini-D 2.0 ..... 699.
★**Synergy Software ... 30 day MBG**
6617 ❼ KaleidaGraph 2.1.3..... 149.
★**Timeworks ... 30 day MBG**
7115 ❼Publish It! *Easy* 109. 7409 ❼Color•It! 165.
★**T/Maker ... 30 day MBG**
❼ClickArt *(bitmapped)* 38. or *(EPS)* .... 82.
★**Virtus Corporation ... 30 day MBG**
4488 ❼WalkThrough 1.1 ..... 309.

★**Manhattan Graphics ... 30 day MBG**
4990 ❼*Ready,Set,Go!*—Offers powerful tools for all phases of the publishing process: an electronic paste board; customizable grids; text rotation; kerning; text-wrap; style sheets and glossaries; & advanced graphics tools .. **$219.**

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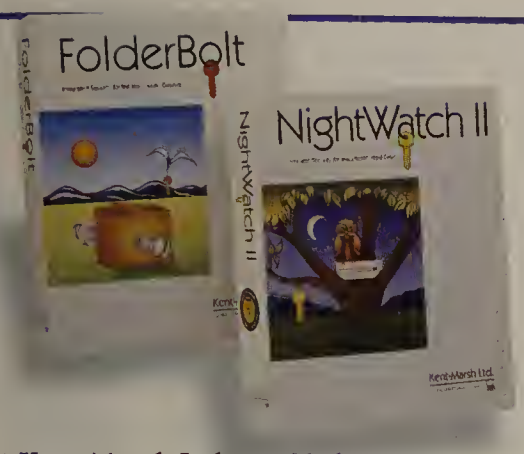
★**Abbott Systems ... 30 day MBG**
2515 ❼Calc+ 1.0 36. 5236 ❼CanOpener 2.0 309.
★**Aladdin Sytems ... 30 day MBG**
7410 ❼StuffIt Space Saver 34. 6740 Deluxe 3.3 65.
★**ALSoft ... 30 day MBG**
9808 ❼MasterJuggler 25. 9807 ❼DiskExpress II 45.
5204 ❼ALSoft Power Utilities 1.0.2 ..... 62.
★**Alysis Software ... 30 day MBG**
2687 ❼SuperDisk! 66. 1608 ❼More Disk Space 56.
★**Apple Computer ... 30 day MBG**
1206 ❼At Ease 1.0 ..... 49.
1074 ❼System 7.1 79. 3413 ❼MultiPack ... 349.
7072 ❼QuickTime Starter Kit 1.5 ..... 149.
★**ASD Software ... 30 day MBG**
7085 ❼FileGuard 2.7.4 *(1 user)* ..... 138.
★**Atticus Software ... 60 day MBG**
9120 ❼Super 7 Utilities ..... 64.
★**Berkeley Systems ... 30 day MBG**
5737 ❼After Dark 2.0w. 28. 2196 ❼Bundle. 39.
7987 ❼Art of Darkness Book *(Peachpit Press)* 16.
3392 ❼Star Trek: The Screen Saver..... 34.
★**Casa Blanca Works ... 30 day MBG**
1593 ❼Drive 7 2.3 ..... 49.
★**CE Software ... 60 day MBG**
1727 ❼CalendarMaker 31. 8024 QuicKeys^2.. 89.
★**Central Point ... 30 day MBG**
5041 ❼MacTools 2.0 ..... 105.

★**Aladdin Systems ... 30 day MBG**
6740 ❼*StuffIt Deluxe 3.3*—1992 *MacUser*'s Editors' Choice Award Finalist for *Best Compression Product*. Solves all your needs from archiving to transparent compression **$65.**
7410 ❼*StuffIt SpaceSaver 1.0* ..... **34.**

★**Claris ... 30 day MBG**
8734 ❼HyperCard Development Kit 2.1..... 139.
★**Connectix ... 30 day MBG**
8441 ❼CPU *(Connectix PowerBook Utilities)*... 49.
Coral Research
7310 ❼TimeLog.... 62. 7309 *(10 Pack)*..... 399.
★**Dantz Development ... 30 day MBG**
9115 ❼DiskFit Direct 1.0.... 29. 3393 ❼Pro.. 72.
5255 ❼Retrospect 147. 7945 ❼Remote 1.3 264.
★**Datawatch ... 30 day MBG**
4803 ❼Virex/Mac or 8561 ❼911 Utilities..... 62.
★**Fifth Generation ... 30 day MBG**
4287 ❼PYRO! 4.01 27. 3955 ❼Suitcase 2.1 53.
8286 ❼SuperLaserSpool 3.0..... 99.
7404 ❼DiskDoubler 52. 4838 AutoDoubler.. 58.
10398 ❼CopyDoubler 1.0..... 39.
FWB, Inc.
7929 ❼Hard Disk ToolKit Personal Edition .... 49.
2999 ❼Hard Disk ToolKit 1.1.1..... 125.
ICOM Simulations
6296 ❼Intermission.. 27. 3731 ❼OnCue II.. 63.
★**Inline Design ... 30 day MBG**
1744 ❼Icon 7..... 31. 9843 ❼Inline Sync 1.0 79.
7068 ❼INITPicker 3.0..... 49.
2913 ❼Redux 1.63.... 49. 1740 Deluxe.... 92.
Insignia Solutions
7552 ❼RapidTrak..... 58.
★**Kent Marsh Ltd. ... 30 day MBG**
9513 ❼FolderBolt 1.02 ..... 71.
1839 ❼NightWatch II ..... 89.
★**KyZen Corporation ... 30 day MBG**
10173 ❼UP Diff 1.0 ..... 125.
★**Leader Technologies ... 30 day MBG**
10272 ❼PowerMerge ..... 79.
★**Logical Solutions ... 30 day MBG**
10169 ❼7th Heaven 2.5 ..... 67.
★**MAXA Corporation ... 30 day MBG**
8692 ❼Snooper HW & SW Kit ..... *special* 115.
8694 ❼Snooper *(software only)* ..... *special* 89.
MicroMat Computer Systems
3732 ❼MacEKG II 2.0.5 ..... 89.
★**Nine to Five Software ... 30 day MBG**
2020 ❼9 to 5 Office 19. 9767 ❼Reports 2.5 125.
★**Now Software ... 30 day MBG**
1793 ❼Now Up-To-Date... 65. 2366 *(10)*. 519.
6925 ❼Now Utilities 4.0.... 95. 8471 *(10)*. 775.
Palomar Software
8210 ❼PLOTTERgeist 2.1 ..... 249.
Pluma, Inc.
8704 ❼Cause or 8713 ❼Net Effect ..... *ea.* 185.
★**Symantec ... 30 day MBG**
5176 ❼AntiVirus for Mac *(SAM)* 3.5..... 64.
10312 ❼AntiVirus for Mac 3.5 *(SAM)* Upgrade 24.
6748 ❼Norton Utilities for Mac 2.0 ..... 95.

the pick of the lot.



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The perfect combination of hard disk & folder security. Rigorous protection at its friendliest. Perfect for single users or site licenses.
9513 ❼*FolderBolt 1.02* ..... **$71.**
1839 ❼*NightWatch II* ..... **89.**

9957 ❼THINK Reference 1.0 ..... 68.
3421 ❼THINK Pascal ..... 165.
2688 ❼THINK C ..... 199.
Teknosys
5203 ❼Help! ..... 88.
★TGS Systems ... 60 day MBG
6667 ❼Prograph 2.5 ..... 299.
★Thought I Could ... 30 day MBG
4843 ❼Wallpaper 1.0.2 ..... 37.
UserLand Software
4753 ❼Frontier 2.0 ..... 185.

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9578 ❼Kaleidoscope ..... 25.
Activision
1039 ❼Shanghai II ..... 29.
1134 ❼Lost Treasures of Infocom Vol. I ..... 40.
2470 ❼Lost Treasures of Infocom Vol. II ..... 29.

MicroMat Computer Systems
3732 ❼*MacEKG II 2.0.5*—1992 *MacUser*'s Editors' Choice Award Finalist for *Best Protection Program*. Provides in-depth knowledge on what makes your Mac tick. Able to isolate/diagnose intermittent failures ..... **$89.**

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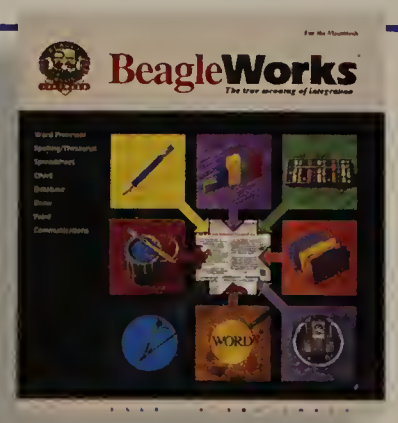
2517 ❼TRISTAN Pinball ..... $33.
★Baseline Publishing ... 30 day MBG
7785 ❼Talking Moose 4.0.2 ..... 22.
Broderbund Software
9059 ❼Arthur's Teacher Trouble ..... 41.
6516 ❼The Playroom 2.0 *(CP) (color)* ..... 29.
❼Carmen Sandiego Series *(CP)* ..... *ea.* 29.
8298 ❼Amer. Past..... 35. 8285 Deluxe..... 47.
3559 ❼SimAnt or 5871❼SimCity Supreme *ea.* 35.
8266 ❼SimEarth 1.1 ..... 40.
1910 ❼SimLife.... 41. 3307 ❼A-Train.... 39.
Buena Vista Software
1711 ❼Heaven and Earth ..... 34.
Bungie Software
8585 ❼Minotaur 1.01B ..... 47.
★Carina ... 30 day MBG
7761 ❼Voyager II, the Dynamic Sky Simulator 99.
★Centron Software ... 30 day MBG
5910 ❼Crossword Creator ..... 39.
8525 ❼Casino Master... 39. 8524 *(Color)*. 45.
Colorado Spectrum
2554 Mouse Yoke *(aircraft yoke adapter)* ..... 29.
★Cyan ... 30 day MBG
6320 ❼Manhole 1.6 ..... 19.
★Davidson & Associates ... 30 day MBG
3922 ❼Talking Spell It Plus ..... 28.
2574 ❼MathBlaster Plus or 7942 Kid Works 2 34.
Delta Tao Software
2536 ❼Spaceward Ho! or 2439 ❼Strategic Conq. 36.
EARTHQUEST
8050 ❼EARTHQUEST or 3118 ❼Ecology 1.0 34.
★Edmark Corporation ... 30 day MBG
7155 ❼Kid Desk 24. 7318❼Millie's Math House 29.
Electronic Arts
1907 ❼PGA Golf.... 39. 2963 ❼StarFlight II .. 39.
2805 ❼PGA Golf Tournament Course ..... 18.
★Expert Software ... 30 day MBG
6219 ❼Expert Astronomer 1.0 ..... 29.
Graphic Simulations
8083 ❼Missions at Leyte Gulf *(req. Hellcats)*. 20.
4756 ❼Hellcats Over the Pacific 1.0.3 ..... 38.
★Great Wave ... 30 day MBG
6693 ❼KidsMath 2.0 or 2276 Kid's Time.. *ea.* 25.
4334 ❼NumberMaze.. 25. 8527 ❼*(Color)*.. 35.
1513 ❼ReadingMaze *(Color, ages 3-7)* ..... 35.
3471 ❼DaisyQuest *(Color, preschool)* ..... 35.
★HyperGlot Software ... 30 day MBG
(French, German, Italian & Spanish)
❼Word Torture *ea.* 32. ❼Tense Tutor *ea.* 38.
❼Pronunciation Tutor
(Span., Fren.) ea. 32. *(Germ., Chin.) ea.* 38.
★Inline Design ... 30 day MBG
1562 ❼3 in Three... 31. 7652 ❼Cogito ..... 37.
1944 ❼Swamp Gas 31. 1747 ❼Europe ..... 37.
7646 ❼Tinies or 7650 S.C.OUT *(Jan. '93) ea.* 37.
8809 ❼Tesserae 31. 3414 ❼Mutant Beach. 37.
Innerprise
1662 ❼CyberBlast ..... 25.
Interplay Productions
1894 ❼BattleChess *(3D animation)* ..... 29.
1893 ❼CheckMate *(infinite play levels)* ..... 31.
★Learning Company ... 30 day MBG
2670 ❼Reader Rabbit 3.0 *(CP) (ages 4-7)*..... 34.
9570 ❼Reader Rabbit 2 1.0 *(ages 5-8)* ..... 34.
3281 ❼The Writing Center 1.0 ..... 51.
★Leister Productions ... 30 day MBG
7126 ❼Reunion 3.0 ..... 115.
★MECC ... 30 day MBG
3963 ❼Oregon Trail 1.1 ..... 28.
3960 ❼Number or 3959 Word Munchers... *ea.* 18.

UserLand Software
4753 ❼*Frontier 2.0*—1992 *MacUser*'s Editors' Choice Award Finalist for *Best Development Tool*. Power-user's scripting system for System 7. "Mac users have wanted something like this since 1984," (*MacUser* 12/91) ..... **$185.**

★Microlytics ... 60 day MBG
7871 ❼Berlitz Interpreter ..... 34.
MicroProse
9520 ❼Civilization: Sid Meier's ..... 39.
★Microsoft ... 30 day MBG
2868 ❼Flight Simulator 4.0 *(CP)* ..... 42.
★Nordic Software ... 30 day MBG
8257 ❼Preschool Pack - Color 2.0 ..... 34.
7470 ❼Jungle Quest 30. 7537 ❼Kolor Klips 37.
★Penton Overseas ... 30 day MBG
❼VocabuLearn/ce Levels I & II *(Span., Fren., Germ., Ital., Rus., Japan., & Heb.)* ... *ea.* 35.
❼VocabuLearn/ce Level III *(Span., Fren., Germ., Ital., Rus., & Japan.)* ..... *ea.* 35.
★Personal Training Sys. ... 60 day MBG
Training for System 7, Excel, Lotus 1-2-3, Persuasion, FileMaker Pro, PageMaker, Illustrator, FreeHand, Word, HyperCard, QuarkXPress, ClarisWorks & Mac. *ea.* 49.
Pluma, Inc.
8695 ❼Capitalist Pig ..... 34.



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3119 ❼*BeagleWorks*—Integrated word, spreadsheet, database, paint, communications & draw modules all in one package. Features include In-Context Editing, irregular text wrap, auto-sum tool, etc. Special limited offer only **$69.**

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5737 ❼*After Dark 2.0w* ..... **28.**

★**Que Software ... 30 day MBG**
9743 ❼Typing Tutor V ..... 29.
Sierra On-Line
9078 ❼Stellar 7 ..... 21.
3552 ❼Leisure Suit Larry V or 7396 Red Baron 39.
★**SoftStream ... 30 day MBG**
4489 ❼Galactic Frontiers *(1 to 4 players)* ..... 38.
Software Toolworks
4619 ❼Mavis Beacon Typing 1.3 *(CP)* ..... 29.
★**Spectrum Holobyte ... 30 day MBG**
3464 ❼Tetris.... 22. 3017 ❼Wordtris 1.0 ..... 28.
4835 ❼Super Tetris *(10 levels of difficulty)* .... 28.
3459 ❼Falcon.. 33. 9113 ❼Falcon Color.... 39.
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3287 ❼Warlords *(empires at war)* ..... 34.
StudyWare
1395 ❼StudyWare for Calculus ..... 23.
❼ACT, GMAT, GRE or SAT Prep ... *ea.* 29.
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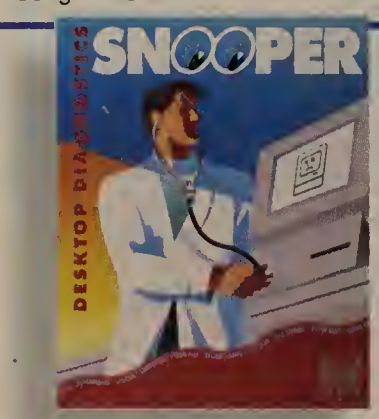
7624 ❼NEMESIS Go Master 5.0 ..... 35.
7623 ❼NEMESIS Go Master Deluxe 5.0 ..... 99.
Velocity
2934 ❼Spectre... 34. 5280 ❼LAN 3-Pak ..... 57.

VIDEO AND SOUND
MONITORS, MUSIC, ANIMATION

★**ARS NOVA ... 30 day MBG**
9114 Songworks 1.0 ..... 64.



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8692 ❼*Snooper Hardware & Software Kit*—Sad Mac? Diagnose from your Desktop with Snooper. Check out your hardware with over 60 tests. Rate your Mac's performance. A must for your Utilities folder ..... **special $115.**

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7013 Voice Navigator SW w/Headset Mike $319.
7014 Voice Navigator SW w/Desktop Mike.. 319.
Coda Music Software
8188 ❼MusicProse 2.1 189. 5604 ❼Finale 549.
★**DiVA Corporation ... 30 day MBG**
3011 ❼VideoShop 1.0 ..... 369.
E-Machines
9067 ColorLink LC 479. 9070 ColorLink DC/T 510.
10321 ColorPage T16II. 1299. 9064 T19II 2299.
9072 Double Color LX. 639. 9073 SX..... 359.
9066 Futura SX.. 479. 9065 Futura MX .. 799.
9063 Futura LX ..... 999.
Envisio
4106 ❼Quick-16 ..... 449.
Macromedia
5486 ❼Sound Edit PRO 2.05 ..... 199.
7651 ❼Action! 2.0 ..... 349.
4598 ❼MacRecorder Sound System PRO... 239.
5087 ❼MacroMind Director 3.1.1 ..... 799.
2246 ❼MacroMind Three-D 1.2 ..... 999.
NEC
4252 MultiSync 3FGx ..... 689.
★**Nutmeg Systems ... 30 day MBG**
❼15" Monochrome System for the II, LC, SE/30, si and SE ..... *ea.* 519.
Passport Designs
10362 ❼Passport Producer ..... 249.
8250 ❼Encore 2.5.2 ..... 379.
Radius
1738 PrecisionColor Pivot *(reqs. interface)*.. 999.
7870 Rocket 33 ..... 2199.
1736 PrecisionColor Display/20S ..... 2499.
RasterOps
8944 RasterOps 24STV ..... 799.
Sigma Designs
6944 Power Portrait *(platinum)* ..... 679.
Software Toolworks
5201 The Miracle *(piano teacher)* ..... 349.
Sound Source
❼Star Trek: Original TV Vol. 1 or 2....*ea.* 30.
❼Star Trek: Next Gener. Vol. 1 or 2.... *ea.* 35.
1759 ❼AudioClips: 2001 A Space Odyssey.. 35.
★**SuperMac Technology ... 30 day MBG**
4122 VideoSpigot LC.... 255. 4114 IIsi.... 339.
4164 VideoSpigot *(for NuBus)* ..... 379.
7676 VideoSpigot Pro or 3691 Pro si... *ea.* 1099.
9074 Spectrum/24 PDQ+ ..... 1649.
10286 Spectrum/24 Series IV ..... 889.
7679 Spigot & Sound.. 489. 7678 Pro... 1189.
7677 17" SuperMatch Multimode ..... 1249.
1805 20" SuperMatch Color Display ..... 1599.
9075 21" SuperMatch Color Display ..... 2699.
4720 21" Platinum Two-Display ..... 1099.

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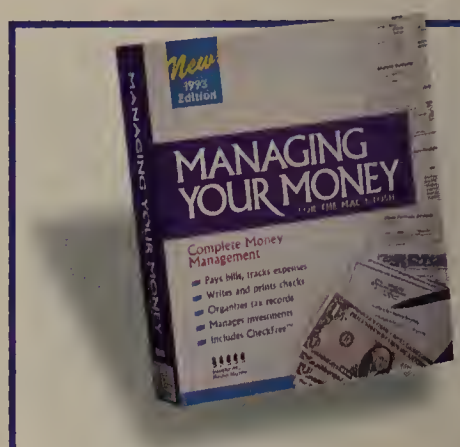
Against All Odds
10330 From Alice To Ocean Book *(w/CD-ROM)* 39.
Broderbund
3730 ❼Just Grandma and Me *(CD-ROM)* ..... 34.
CD Technology
2321 CD-ROM Caddy ... 11. 2533 *(5 Pack)* 49.
4084 America Alive! *(CD-ROM)* ..... 75.
8057 Porta Drive CD-ROM ..... 579.
Creative Multimedia Corp.
8739 ❼Beyond the Wall of Stars ..... 40.
8744 ❼Total Baseball 40. 2484 Family Doctor 45.
★**Cyan ... 30 day MBG**
1343 ❼Manhole 23. 2717 Cosmic Osmo 1.1 37.
★**Highlighted Data ... 30 day MBG**
7771 ❼Webster's Dictionary *(CD-ROM)* ..... 149.
★**HyperGlot Software ... 30 day MBG**
(French, German, Italian, or Spanish)
❼Berlitz Think & Talk *(CD-ROM)*. *ea.* 125.
ICOM Simulations
3717 ❼Sherlock Holmes, Consulting Detective 44.
Interplay Productions
7111 ❼Battlechess CD-ROM ..... 45.



★**MECA ... 60 day MBG**
2796 ❼*Managing Your Money 5.0*—A host of enhancements makes version 5.0 perfect for financial planning & management. Password protection, lump sum interest, dividend distribution, dividend reinvestment, & much more **$32.**

★**METATEC/Discovery Sys.. ... 30 day MBG**
6823 ❼Best of MIDI Connection ..... 31.
4007 ❼World Almanac & Book of Facts 1992 50.
★**Multimedia Library ... 30 day MBG**
Image Series Vol. 1-4 ..... *ea.* 105.
NEC
6577 ❼CDR-37 CD-ROM Portable Drive ..... 439.
6582 ❼CDR-74 CD-ROM Drive ..... 629.
4146 ❼CD Express *(with CDR-25)* ..... 429.
4132 ❼MultiMedia Gallery *(with CDR-74)* .... 865.
★**Presto Studios ... 30 day MBG**
10351 Hi-Rez Audio Vol. 1 ..... 84.
Software Toolworks
10308 US Atlas 34. 4397 Time Table/History.. 49.
3915 ❼Grolier Encyclopedia *(CD-ROM)* ..... 249.
Wayzata Technology
Font Pro Vol. 1 & 2 ..... *ea.* 62.
8219 CD Fun House ..... 35.
10188 Macnificent 7 ..... 48.

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MODEMS, MAIL, NETWORKS

★**Apple Computer ... 30 day MBG**
7073 ❼Mac PC Exchg. 69. 7102 AppleShare. 969.
7101 ❼AppleTalk Remote Access ..... 159.
★**Applied Engineering ... 30 day MBG**
8362 ❼QuadraLink *(with AE Shadow)* ..... 269.
10361 ❼QuadraLink DMA ..... 399.

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★ **CompuServe ... 60 day MBG**
1676 ❼Mac Membership Kit 2.0..... 25.
1673 ❼CompuServe Navigator 3.1 ..... 49.
1674 ❼Membership Kit/Navigator Bundle..... 72.
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4842 ❼MacLink Plus/Translator 7.0..... 109.
1823 ❼MacLink Plus/PC 7.0 ..... 129.
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DaynaPORT E: *(BNC or 10 BASE-T) ea.* 149.
DaynaPORT SCSI/Link *(BNC or 10 BASE-T)* 269.
8719 EtherPrint 339. 9888 *(10BASE-T) ea.* 339.
1962 PathFinder..... 599.
10359 Network Vital Signs ..... 249.
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6758 ❼DoveFax 2.3 .. 199. 3352 NuBus ... 199.
9634 ❼DoveFax+V ... 299. 4111 NuBus.... 299.
10199 ❼DoveFax Pro..... 399.
10200 ❼DoveFax Pro+V ..... 499.
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5295 ❼Dow Jones News Retrieval Membership 24.
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8726 Farallon Concentrator PN710-1 ..... 1999.
4869 PhoneNET Connector 10-Pk *(DIN8)*... 195.
2206 PhoneNET StarController 307..... 879.
4802 Star 357... 899. 4814 Star 377 ..... 1299.
9805 ❼Timbuktu 5.0 or 4866 ❼/Remote 5.0 129.
6513 ❼Timbuktu Remote Twin Pack..... 199.
9516 ❼PowerPath ..... 105.
9518 ❼LocalPath..... 139.
★ **Freesoft ... 30 day MBG**
6115 ❼White Knight 11 ..... 85.
★ **Global Village ... 30 day MBG**
2174 ❼TelePort/Bronze..... 197.
2175 ❼TelePort/Silver 369. 2179 Gold ..... 429.
Hayes
5101 ❼HayesConnect 3.0 *(modem sharing)*.. 73.
2300 ❼Smartcom II Mac 84. 3226 Upgrade. 44.
5971 ❼OPTIMA 24 145. 5970 ❼OPTIMA 96 389.
Insignia Solutions
7557 ❼Access PC... 59. 3229 ❼SoftAT ... 299.
3441 ❼SoftNode..... 105.
9726 ❼Entry Level SoftPC 2.5 ..... 125.
4089 ❼Universal SoftPC ..... 195.

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5524 ❼M9696XV 289. 5523 ❼M1414XV 299.
MASS Microsystems
2280 ❼MASSfm 24/96N Network Fax..... 349.
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7934 PM9600SA Modem 1.26 ..... 289.
9849 ❼SmartPack 9600 *(with Smartcom II)*. 349.
★ **Prometheus ... 30 day MBG**
4724 ❼Home Office *(24/96 w/Voice Mail)*.... 259.
8990 ❼Ultima Home Office *(144/96) (w/VM)* 489.
PSI Integration, Inc.
3143 ❼COMstation ONE... 142. 3142 ❼TWO 247.
5340 ❼COMstation FOUR 369. 6965 ❼FIVE 439.
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4347 ❼NetBridge or 4942 ❼TeleBridge ... *ea.* 399.
NetModem/E *(thick, thin, 10BASE-T) ea.* 1479.
Sitka/TOPS
4188 Teleconnector *(DIN8)* 19. 2230 *(10)*. 179.
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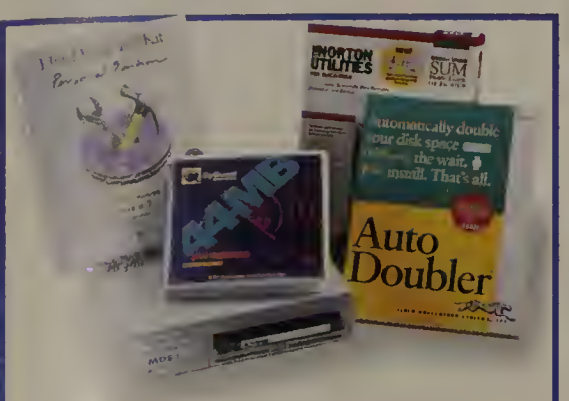

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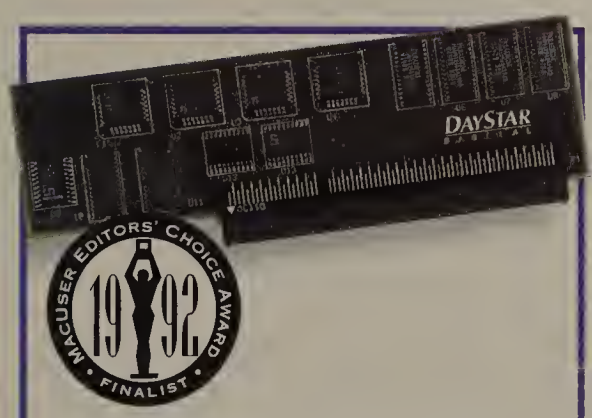

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Art Beat

Behind Macworld's Graphics

BY CATHY ABES

Artist: Illustrator Gordon Studer runs his own design studio in Emeryville, California. His clients have included *Time*, *Business Week*, the *Los Angeles Times*, and *MacWeek*. Lately he has been experimenting with photo-transferring his Mac illustrations onto large canvases, over which he paints with acrylics.

Hardware: Mac IIcx with 8MB of RAM and 80MB internal hard drive; Mass Microsystems DataPak 45MB removable-cartridge drive; Microtek MSF-300ZS.

Software: Adobe Illustrator 3.2; Adobe Photoshop 2.0.

How It Was Done: For the illustration that opens this month's feature on entry-level multimedia, Studer began by doing a rough sketch with a marking pen. He then scanned the sketch and opened it in Illustrator. Saving the sketch as a template (in PICT format), he imported it into Photoshop, where he added bits and pieces of photos and other illustrations to approximate the look of the final illustration.

The illustration for this month's feature on multimedia, "First-Time Authoring."

Going back to the original template in Illustrator, he began drawing the man. He drew the head shape with the pen tool and gave the head a reddish yellow fill (30 percent magenta, 100 percent yellow). For the area around the eye, Studer created a blend from orange (80 percent magenta, 100 percent yellow) to the yellow he used for the face, using two concentric circles. The hair began as a curved 29-point black line to which Studer attached small rectangles that he filled with black and then rotated.

For the Mac's cord, Studer drew a black line—3 points wide—that he made into a dashed line: in the Paint Style submenu (under the Fill menu), he specified a process-color stroke (40 percent cyan, 65 percent magenta) and a dash pattern of 1 point. This resulted in 1-point-thick dashes that were 3 points wide.

For the Mac's screen, Studer created another gradient, which he used to simulate a highlight. He blended two circles, one inside the other—the outer one the same color as the screen background (40 percent cyan, 40 percent yellow), the inner one a light aqua (15 percent cyan, 15 percent yellow). After selecting both circles and the blend tool, he clicked on a point on the inner circle and then clicked on a corresponding point on the outer circle. In the Blend dialog box, he selected 50 steps for the blend. When he was finished, he saved the file in EPS format for importing into Photoshop.

In Photoshop, Studer opened a new file, into which he imported the EPS file, copying and pasting it into what would become the final Photoshop file. Then he had a photographer take numerous black-and-white photographs—various angles of Studer's face, his tie, a guitar, a compact disc, and a billiard ball—which Studer scanned into Photoshop. The photos of the dancer, also scanned, came from Eadweard Muybridge's *The Human Figure in Motion*, published around the turn of the century. Using the Color Balance command (under Image Adjust), he colorized each scanned image in its own separate file. Then he pasted each image into the main illustration, beginning with the nose and the eye (both taken from scanned

continues

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photographs of Studer's face) on the man.

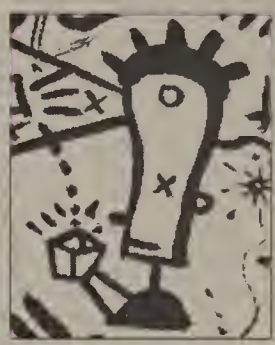
Before he pasted in the scanned photos of the guitar, the CD, and the dancer, Studer went back to the main file. There he drew a shape, then used the Paste Into command to paste the colorized images of the dancer into the shape. He pasted the guitar into another drawn shape and the compact disc into a third shape.

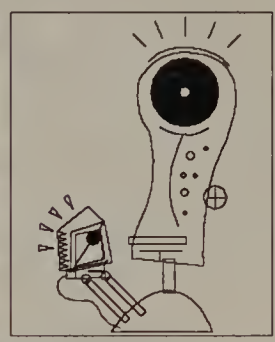
Next Studer added the other elements: the other eye, the two disks, the ear, and the billiard balls. The eye and the ear were both selected with the magic wand and feathered with a radius of 10, then copied and pasted into the main file at 80 percent opacity (using Paste Controls). The two disks were pasted at 50 percent opacity.

To create the five billiard balls and give them the illusion of motion, Studer colorized the original ball and pasted it into the main file at 40 percent opacity using the Motion Blur filter with the angle set at 45 degrees and distance at 10 pixels. After pasting it again, he moved it into position; then using Paste Controls, he pasted it in at 50 percent opacity with Motion Blur at the same settings as before. He pasted the third, fourth, and fifth balls at 60, 70, and 90 percent opacity, respectively, also with the same Motion Blur settings.

Studer drew the projector beam that emanates from the man's eye with the pen tool. Once he'd created the shape by selecting various points, he added noise (under Filter) and then adjusted color balance and brightness to lighten and change the color from blue to green. The sound wave that curves across the guitar was also created by using the pen, adding noise, and adjusting the color balance.

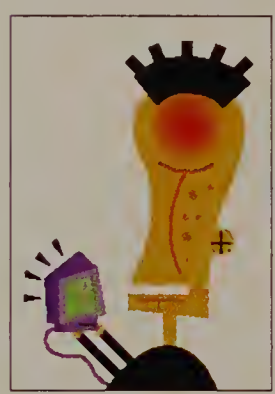
The final file size was 1.92MB; the design process took eight hours. ■





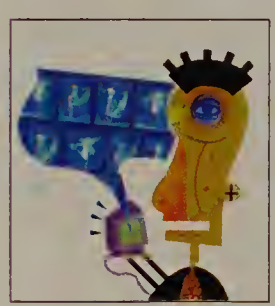
1. The original sketch (left) Gordon Studer did with marking pen, which he scanned and saved as a template in Adobe Illustrator.

2. The drawing of the man and the Mac in Illustrator's work (wire-frame) mode (right).

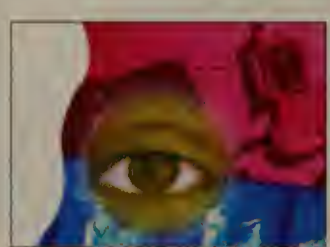


3. The man and Mac in Illustrator's preview mode after Studer colorized them and added blends to the eye area and the Mac's screen (left).

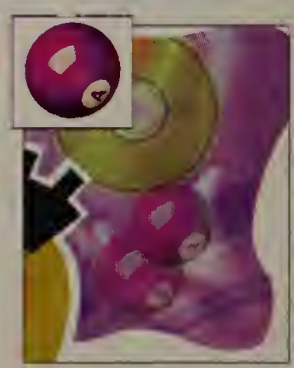
4. One of the scanned photos of the artist (right), which provided an abundant supply of elements—eyes, ear, nose, and tie—to add to the illustration.

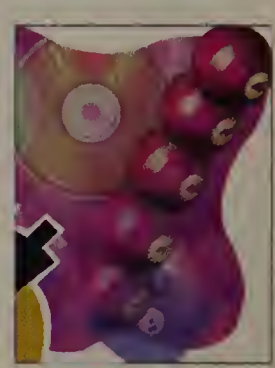


5. In Adobe Photoshop, Studer used the Paste Into command to paste the colorized photos of the dancer inside a free-form shape he had drawn above the Mac (left). After drawing two more shapes, he successively pasted in the scanned photos of the guitar and then the compact disc (right).



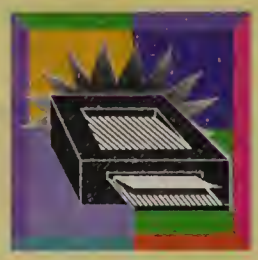
6. Using Photoshop's magic wand tool to select the eye from one of his scanned photos (left), Studer feathered it with a radius of 10, and pasted it into the illustration at 80 percent opacity (right).





7. The billiard-ball photo (inset) was pasted into the illustration at 40 percent opacity with the Motion Blur filter, then repositioned and repasted with the same Motion Blur settings at 50 percent opacity (left). The process was repeated three more times at successively higher opacity levels (right).

8. Studer used the pen tool to draw the light beam emanating from the eye, a simple shape to which he applied a noise filter and adjusted the color balance.



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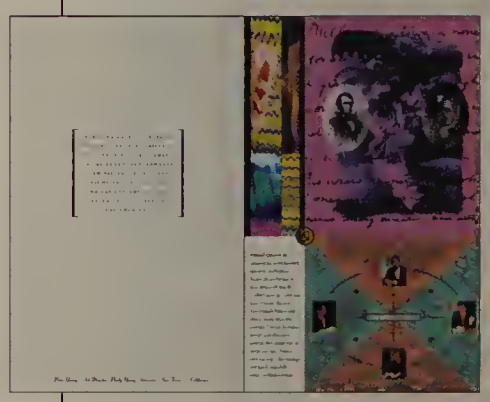

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The Case of Purloined Productivity

BY STEVEN LEVY

GARY LOVEMAN THOUGHT IT was a no-brainer. Do a study to measure how much more productive computer technology has made us? Sure, he said to his colleagues at MIT's Sloan School of Management in 1986. The Sloan people, riding on a bankroll anted up by ten Bigfoot institutions—giants like Kodak and the IRS—were doing a monster job dubbed "Management in the 1990s," and wanted some sort of measurement of how much computers had done for us already. Loveman, now an assistant professor at Harvard, didn't question the premise—that there would be increased productivity to measure. "I assumed that computers were doing something revolutionary," he says.

That was before he crunched the numbers.

There was a surprising paucity of information gathered on the question, but Loveman finally lit on a database that yielded the amount of money spent on what he called information technology. Not surprisingly, this amount increased steadily during the period he charted, from the late 1970s to the mid 1980s. The next step, he figured, would be to isolate the degree to which all these bucks had benefited companies and their industries. Similar studies measuring the benefits of research and development had conclusively demonstrated that R&D was a solid investment, and there was no reason to suspect that computer technology would be a different story. After all, it seems obvious that computers empower us to manage many times the amount of work we might otherwise accomplish.

You can't sit down in front of a computer for ten minutes and think otherwise. Just run down the list of computer applications we know and love—word processors, spreadsheets, databases, page layout. How did we get along without them? Just 10 or 12 years ago, it seems, we were in the ice age hammering on the equivalent of stone tablets! Gary Loveman knew this—you don't get to be an assistant professor at Harvard Business School by missing the nose in front of your face—and so, when he ran all the numbers, totaled the investments in information technology and then compared them to the productivity totals of the industries, and got his results, he was more than a little taken aback.

What happened? Let Dr. Loveman explain. "There was no positive effect," he says. "There may even have been a negative effect."

Excuse me, Dr. Loveman, did I hear you incorrectly? I better refer to the paper you wrote on your study, "An Assessment of the Productivity Impact of Information Technologies." Here it is, in black and white: "The data speak unequivocally . . . there is no evidence of a significant positive productivity impact from IT [information technologies]."

Can it be? Aren't we better off with computers than without them? According to Loveman, as far as raising our overall productivity goes, we're not. He's not saying conclusively that computers aren't worth using—just that if computers are worth using, they're doing a pretty good job of hiding the fact. You can look it up.

Paradox Found

WHEN LOVEMAN BEGAN EXPLAINing his study to people in the computer industry, the response was "a furor." Howling like wounded hyenas, the technoids, suits, and pundits began mouthing the objections. The first complaint, of course, was that Loveman must have made some whopping error in his study. The details and methodology of Loveman's paper are all spelled out, of course, in the jargon and mathematical formulas clear to no one but advanced students of statistical theory. (None of whom has so far identified an error.) But even without the benefit of this neo-Sanskrit, Loveman can convey the compelling logic behind his findings. Let's step through it.

Everyone agrees that computer power is much more prevalent and certainly cheaper than it was in the seventies. "One dollar's worth of quality-adjusted computing power in 1970 cost $73.60 in 1950, and cost only 5¢ in 1984," writes Loveman. (And it's even cheaper now.) Compare this with equipment not associated with computers: a dollar's worth of noncomputer equipment in 1970 dollars cost only 59 cents in 1950, and rose to $2.54 in 1984. It stands to reason, doesn't it, that if computers are at all useful, corporate productivity would skyrocket if companies would devote funds to dirt-cheap silicon rather than to increasingly expensive noncomputer equipment.

Corporations seemed to think so. Investments in information technology rose from less than 2 percent of all capital equipment in 1978 to almost 8 percent in 1985, according to Loveman. And remember, since computer power gets cheaper every year, that fourfold increase in resources means many times that in terms of increased power. So much silicon muscle has been delivered to these corporations that we should see some big spikes in their output, right? But when we flip to the productivity charts—economists have formulas to accurately graph this seemingly elusive quality—we see something quite alarming. Productivity in the white collar sector is awful! For the past 15 years or so we basically have had *no* gains in productivity. How come computers haven't mitigated that?

The mystery deepens when you compare U.S. productivity with that of other industrialized countries. Even though we are far more computerized than our international competitors, Loveman notes, "we have done miserably compared to other countries." Why haven't our computers helped?

What have computers done for us lately? Maybe nothing.

It's a conundrum—some have dubbed the phenomenon the Productivity Paradox. We sit day after day at our machines, risking blurred vision and carpal tunnel syndrome. Why? Because we *know* these things are useful, damn it! We hammer away, churning out documents, massaging data, modeling the future, navigating databases, because this is obviously the way to get lots of work done in very little time. In hundreds of corporations, people like us are squinting at their own little ma-

continues

chines, doing the same thing. *So where's the beef?* If we can't measure it, does it mean it isn't there?

Free to Be . . . Stupid

ATTEMPTS TO EXPLAIN—OR IN SOME cases, explain away—the Productivity Paradox come in several flavors. The first postulates that while computers help individuals get work done, the structure of corporations is based on old methods of doing work—and the hierarchy-bound dinosaurs of industry are unable to take advantage of new ways of working. While I have little confidence that companies are adequately managed, I find this explanation unsatisfying—on an individual level, people use computers well. And if people get more work done with these machines, it stands to reason that you need fewer people to do the same work. This would seem to increase productivity. Yet that doesn't happen. Loveman cites the example of the Internal Revenue Service, which expected its field agents to do more work once they were outfitted with portable computers. They got the computers. They didn't get more work done. No one knows why.

A second explanation is that the benefits of information technology, while huge, are too elusive to measure. Using computers, this theory goes, is more likely to increase quality than quantity of output. This theory has the advantage of being a judgment call, impossible to disprove. Yet Loveman takes issue with it, using journalism as an example. Reporters now have computers on their desktops, he says, "but is the quality any better?" (Personal opinion of columnist: no.) And if information technology improves the quality of what we do, why doesn't it show up in the bottom line?

It is while talking about computers in newsrooms that Loveman gets to one of the most cogent explanations of the Productivity Paradox—the seductive ability of computers to encourage one to do essentially useless work. "Ten years ago," he says, "if a reporter on deadline wanted to do retrospective background on a story, there was no time. Now, using the computer, he or she can easily access the archives." As a result, claims Loveman, in the interest of thoroughness reporters feel compelled to access the archives while preparing a story—yet they rarely use the information in the finished product. The computer has introduced a new, nonproductive step in their labors.

"Someone once said that the computer helps us do stupid things faster," Loveman muses. "Proposals for professional services used to be a single page. Now they're routinely voluminous. Computers allow us to do this, and it becomes the standard—no one does it in one page any more." Loveman also cites cases where, just because it is easy to do, companies begin reporting sales breakdowns weekly rather than monthly—causing more frequent evaluations, more work.

It isn't that people are stupid—it's that while computers are indeed powerful tools, "we haven't learned to use them," says Loveman. However, he is optimistic that the situation may change. He knows cases where companies have successfully put information technology to work by tailoring their computing activities to the way they work—and vice versa. His favorite example is Taco Bell, where the company built from scratch a new system to organize the way managers monitor and order supplies. Because the system was designed to implement a new direction in the company, the supply-order system was unencumbered by the old ways of doing

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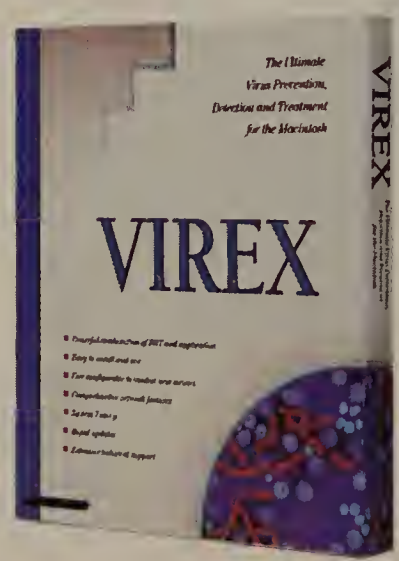

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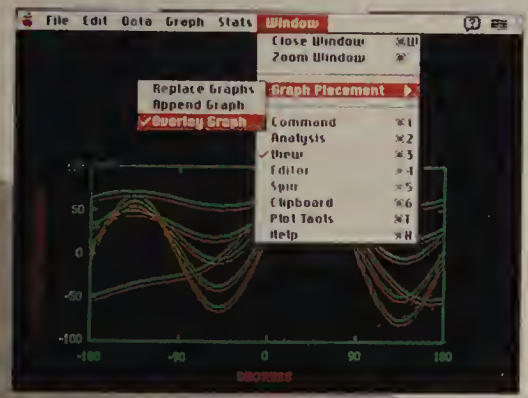

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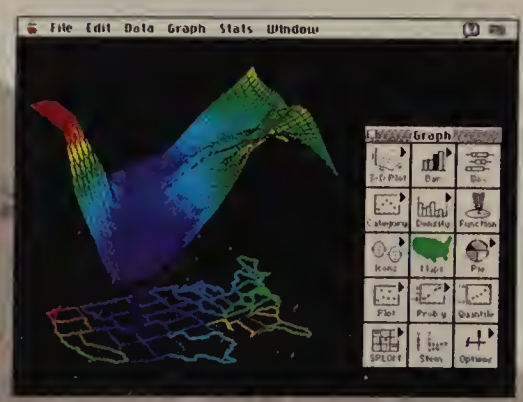

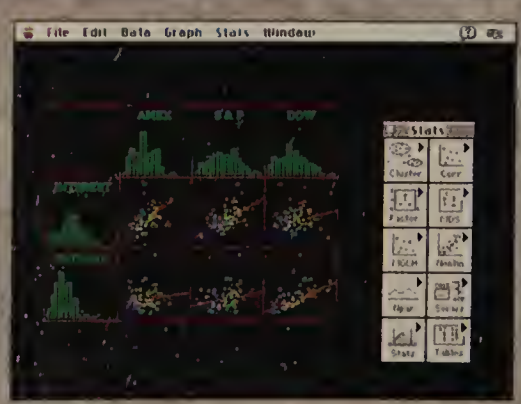

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business and could be fully, coherently integrated with the new plan. Whereas the old orderly system enabled a Taco Bell regional manager to handle 5 franchises, a manager under the new system oversees 30 franchises.

Loveman believes that in the future more companies will do this. And eventually, computers will be easier to use, requiring less of our time to successfully exploit them. Only then will the Paradox release us from its grip.

The Paradox and I

WHEN I FIRST HEARD ABOUT THE PRODUCTIVITY Paradox, I thought it mainly applied to unwieldy corporate behemoths and not to me, a lean-and-mean free-lance writer whose desktop is now a killer cockpit of high tech. As the capable pilot of this vehicle, I was confident that my personal productivity had taken a stratospheric leap. I had come to feel that writing an article, column, or book the old way would be akin to making a transcontinental excursion by wagon train. I considered myself living proof that the Productivity Paradox was a crock.

Yet the more I ponder it the less certain I become. Has using a computer enabled writers to get their work done in much less time, and get to enjoy gobs of leisure time? Well, no. I work all the time and so does everyone else I know.

So where's the hole that my productivity fell into? I had a small epiphany on this matter just this morning, while upgrading my word processor. Even though I was only moving a tenth of a point in version number, from Word 5.0 to Word 5.1, the installation process was the same as if I was starting from scratch—in other words, long and tedious. And then, once the relevant files were safely snuggled in my Macintosh, I had to read through the documentation for half an hour to figure out what the difference is between this and the previous release, and whether the new features made sense for me. During the next few weeks I will cumulatively log a few more hours experimenting with the new release, hoping to find ways it will make my life easier. If I am lucky, Word 5.1 will eventually save more time and effort than the time and effort I have expended on dealing with the upgrade. Of course by then I may be trying to deconstruct Word 6.0.

Back in the bad old days when I toiled on a typewriter, I never spent a whole morning installing a new ribbon. Nor did I subscribe to *RemingtonWorld* and *IBM Selectric User*. I did not attend the Smith-Corona Expo two times a year. I did not scan the stores for the proper cables to affix to my typewriter, or purchase books that instructed me how to get more use from my liquid white-out.

You want a *real* paradox? Here goes: Information technology has vast potential to improve productivity. We recognize this. So much so that we spend vast amounts of time studying computers, learning more about them, acquiring accessories for them, and entering their culture. All this effort, of course, makes us less productive overall.

I'm not even going to mention computer games. If Tetris had never existed, our national productivity might triple! (Hey, didn't the Russians create that game?)

Yes, the Productivity Paradox is counterintuitive. But I have come to accept it. The next step is accepting responsibility for it. Because the fault, dear Horatio, lies not in our technology but in ourselves. **m**

STEVEN LEVY's most recent book is *Artificial Life: The Quest for a New Creation* (Pantheon, 1992).

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☑ **Disk-for-disk or better replacement.** If you have a problem with your La Cie drive while under warranty, we'll ship you a replacement within 48 hours. We've also been known to replace disks with better ones, rather than make a customer wait. That's how important your drive is to you. That's how important you are to us.

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La Cie's Cirrus and Tsunami drives outpace the competition for performance and value. That's because they're loaded with quality features like Quantum mechanisms, whisper quiet fans, 12ms access time, award-winning chassis designs and our Silverlining disk management software. From 40MB to 1.2GB take home your pick of load capacities. Each delivers the streamlined styling, diminutive footprint and single-handed convenience of the true portable. And that's not all. All Cirrus and Tsunami drives offers the La Cie's exclusive active switchable termination. No wonder they're rated tops in their class, year after year.

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Full lite speed ahead!

It's hard to beat the safety record of optical drive technology. And now you can achieve long range data safety with the next generation of removable-media optical drive technology. Smaller, faster and less expensive than conventional 5¼" optical drives, La Cie's Cirrus Optical drives use disks that are the same size as 3½" floppies, but store about eighty-eight times more data than high-density floppy disks.

The Cirrus Optical also delivers a speedy 38ms seek time. Tailored to fit our sleekly-styled, award-winning Cirrus chassis, whisper quiet, fan-cooled Cirrus Optical drives offer massive storage capacity, *lite*weight portability, high-speed performance and removable media convenience.

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Doesn't your Quadra deserve the speed and safety performance of our La Cie 3½" Optical drives? We think so too. That's why we make brackets (and a really good instruction manual) available for mounting this money-wise, crash avoidance system inside your Quadra.

Silverlining, 1-year warranty, super support.

Every La Cie Cirrus Optical drive comes complete with System 6, System 7 and Silverlining—the industry's number one rated disk management software. Plus you get a full year's parts and labor warranty with two day warranty replacement. What more can you ask? 30-day, 100% Satisfaction Guarantee, that's what.

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☑ **All La Cie products are agency certified.** Uncertified equipment can be unsafe. Products sold without FCC certification are even illegal. Yet, non-certified equipment is sold every day. Check certification before you buy, to make sure no one sells it to you. We also burn in every drive for 24 hours for your protection.

☑ **La Cie is a real manufacturer—not just a reseller.** You learn a lot when you manufacture your own products. What works. What doesn't. And why. That's why we're never stumped for an answer when you need help. That's why—by anticipating problems—we can avoid them. And that's why our customers are bowled over with our service and support—not just blown off.

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La Cie's DAT drives can backup without making you go in reverse.

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Not backing up safely is like driving without car insurance. It can be very costly in the event of an accident. For safe, cost-effective backup La Cie's 155MB tape drives offer quality TEAC mechanisms and removable convenience. Or step up to our 600MB tape drives. They have the same TEAC quality, but with four times the storage. Now that's win-win.

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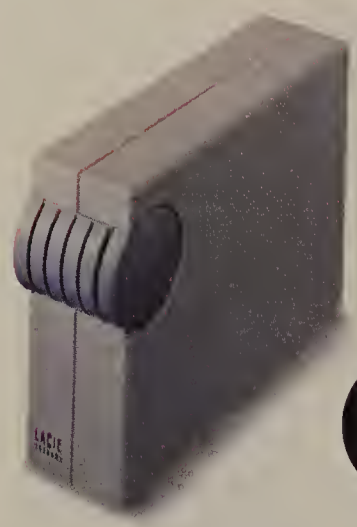

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Our hard drives features a wide selection of capacities and quality brand-name mechanisms—all at very affordable prices. All drives have switchable active termination, efficient, quiet fans and universal power supplies.*

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120MB (3½")	$399	$499	$519	$549
127MB (3½")	$339	$439	$459	$489
170MB (3½")	$369	$469	$489	$519
240MB (3½")	$589	$689	$709	$739
525MB (3½")	$1149	$1249	$1269	$1299
700MB (3½")	$1329	$1429	$1449	$1479
1.05GB (3½")	$1669	$1769	$1789	$1819
1.2GB (3½")	$1899	$1999	$2019	$2049
80MB (2½") for Powerbook	$369	See PocketDrive		
120MB (2½") for Powerbook	$469	See PocketDrive		
160MB (2½") for Powerbook	$699	See PocketDrive		

Seagate	Internal	ZFP+
1.2GB (3½")	$1799	$1899**
650MB (5¼")	$1299	$1449
1.2GB (5¼")	$1749	$1899
1.6GB (5¼")	$2299	$2449
2.1GB (5¼")	$2949	$3099
2.4GB (5¼")	$3299	$3449

HP	Internal	ZFP+
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1.2GB (5¼")	$1989	$2139
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Our Cirrus backup solutions have the power to handle large backup jobs. Includes Retrospect™ and 1 free tape.

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Our 44-88MB removable media drives deliver Syquest technology in a zero footprint case. Includes 1 free cartridge.

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120MB Quantum LPS Drive	$469
240MB Quantum LPS Drive	$819

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Circle 246 on reader service card

Exploring the Online World

BY DEBORAH BRANSCUM

BY SIMPLY ARMING YOURself with a modem and communications software, you can steer your Mac toward adventure, intrigue, and shareware without ever leaving home. Large commercial services such as Prodigy, CompuServe, and America Online have a lot to offer their members, including tech support, shopping, and business reports. But such services are only a part of the online galaxy. There's also a constellation of mom-and-pop bulletin board systems (BBSs), boards run by the government and businesses, and international systems such as FidoNet and Internet. This month I focus on hobbyist BBSs of particular interest to Mac users; next issue I'll explore global networks.

Getting Started

ONLINE EXPLORERS NEED ONLY A Hayes-compatible modem, communications software, and a phone line to connect to the larger world. I've seen inexpensive 2400-bps modems listed as low as $63 by mail, and prices for 9600-bps modems continue to drop. (See "How to Buy a Modem," *Macworld*, August 1992, for advice.) Popular communications programs include MicroPhone Pro and White Knight. If you're just starting out, save your money and get ZTerm ($30 shareware) from a user group instead.

If you intend to download files, make sure you have a virus-detection program. *Sysops*, or system operators, do all they can to screen uploaded files, but electronic vandals sometimes sneak past to leave nasty surprises in harmless-sounding files. SAM and Virex are popular commercial programs that detect viruses; Disinfectant is the classic freeware choice and should be available through most user groups. (If you don't belong to a Mac user group, call Apple at 800/538-9696 ext. 500 for the name and number of a MUG near you.)

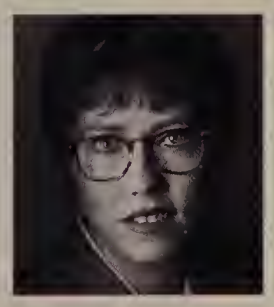
Once the software has been installed and the modem connected, the adventure begins. Going online is pretty straightforward once you've entered a BBS telephone number into your communications program and hit the log-on button or equivalent. You should hear the sound of the number being dialed, then a pause and a high-pitched whine and/or static as your modem connects to the BBS.

Every BBS is different, but most ask new users to register by providing their name, address, and telephone information. Even if boards allow the use of *handles*, or made-up names, sysops still want to know the real you, partly because of legal concerns. BBSs normally expect users to abide by a particular set of rules. Once new users are registered, which can take a few days to a week, callers can usually roam freely through conference areas, download files, and send mail. Local boards are the cheapest, of course, but online junkies find themselves dialing cross-country. Sprint (913/541-1025 or 800/736-1130) makes that less painful with a special account called PC Pursuit, which offers 30 hours of modem-to-modem communication for $30 per month. Folks with disabilities get access to 90 hours for the same price.

Finding a Board

BBSs COME IN EVERY CONCEIVABLE size and personality. You can find romance, religion, or recipes, and that's just for starters. There are an estimated 45,000 public BBSs in the United States. Some are fee-based boards or require membership; others are free. Most of them are expensive hobbies for the sysops, who run them as labors of love. The time and expense bulletin boards require means that they are often short-lived, so a BBS that you read about today may be gone tomorrow.

Exceptions to the here-today-gone-tomorrow rule are BBSs run by long-established Macintosh user groups. Popular boards include Seattle's Downtown Business Users Group (206/624-8783), the New York Macintosh User Group (212/431-9776), Planet BMUG (510/849-2684), the BCS Mac board (617/864-1712) of the Boston Computer Society, and the Los Angeles Macintosh Group BBS (310/559-6227). These BBSs are a benefit of MUG membership; nonmembers can browse, but rather briefly.



Steer your Mac toward intrigue and adventure

OneNet Reaches Out

THE VAST MAJORITY OF BBSs RUN CHARacter-based systems designed for DOS-based computers. You can still log on to such systems, but they don't support the Mac interface and can be tedious for icon aficionados. Exceptions to this rule are BBSs using Telefinder software from Spider Island Software or FirstClass from SoftArc. Both icon-based systems should be easy to use and familiar to Macintosh users. Telefinder BBSs are the most common, with some 2000 worldwide, according to Spider Island. (Call Spider Island's BBS at 714/730-5785 for numbers of Telefinder boards.) The progam has an automatic file-download feature that I found particularly nice, and you can sort messages by name, date, or message number. Telefinder also offers a gateway to FidoNet (more on that next month) and discussions on hundreds of topics. Still, discussion does not seem to be the primary draw of the few Telefinder boards I was able to access—downloading files is. The Arizona Macintosh Users Group has a three-line Telefinder-based BBS (602/553-0721) and is experimenting with FirstClass as well. According to AMUG president Michael Bean, Telefinder is great for downloading files, which is what most interests the AMUG membership, but FirstClass is a better message reader.

I agree. FirstClass has some nice features, including the ability to browse conferences while downloading files. At this writing, FirstClass doesn't have a gateway to all the resources of FidoNet. Still, an emerging group of FirstClass-based BBSs are bringing Macintosh users together to participate in some interesting conferences.

Scott Converse is executive director of the OneNet Member Network and founded the OneNet Los Altos BBS (415/948-1349) in August 1991 in Silicon Valley. OneNet Los Altos is noteworthy for several conferences, including its Ask Apple area, frequented by local Apple employees who like to hang out on the board after work,

continues

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CAD0024 $219*
Publisher: GraphSoft

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❼**Accountant, Inc. MultiUser Version 3.5**-Finalist-1992 MacUser Eddy Award for Best Financial Program. Offers all the same features as single user, plus the convenience of multi-user. Comes with software for 3 users.
FIN0133 $669
Publisher:
Softsync, Inc.

$335*

MacEKG 2.0

❼This *preventative maintenance* utility is for *everyone* who owns a Mac Plus or above (System 6.0.7 or greater). Once installed, it runs by itself. MacEKG actually learns your machine and how it should behave. If a significant change has occurred, EKG will inform you by voice and indicate problems worth investigating. Is your disk drive slowly dying out on you? In only a few minutes EKG has determined the health of your machine for the day. EKG helps with inventory control by logging NuBus, ADB, and over 250 System configuration parameters. The program also includes ReActivator, component-level tests previously available only to Authorized Apple technicians, and a unique "capsule" to export for remote diagnostic analysis.
Publisher:
Micromat
UTI0285

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❼The new Microtek ScanMaker series provides a simple and affordable way to bring color and black-and-white images into your computer at resolutions up to 1200 dpi, and scans color photographs or artwork in full 24 bit color or 256 shades of gray. The ScanMaker II is bundled with Adobe PhotoShop LE. The ScanMaker II XE is great for scanning color or black-and-white images and is bundled with a full version of Adobe's PhotoShop, the premier image processing software for the Macintosh.
Manufacturer:
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❼**StuffIt Deluxe 3.0** is the Complete Compression [illegible] Deluxe 3.0 can solve all your compression needs from a [illegible] to transparent compression and includes StuffIt SpaceSaver. [illegible] is the fastest most efficient compression product available. [illegible] Match intelligently stuffs only the files that meet the [illegible]
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❼**StuffIt SpaceSaver** is unlike other compression products [illegible] disk space (with lightning speed) without effort on your part. [illegible] while your Mac is idle or when you say "Compress this for me." [illegible] provides complete on the fly compression in one package. [illegible] also one of the least expensive, most productive and easiest to [illegible] compression products available.
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Publisher:
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FON 0480
Publisher: SoftKey
Suggested Retail: ~~$59.95~~
System Requirements: Mac Plus or higher; 2MB RAM, hard disk drive; System 6 or later. TrueType requires System 7. ATM recommended for PostScript fonts.

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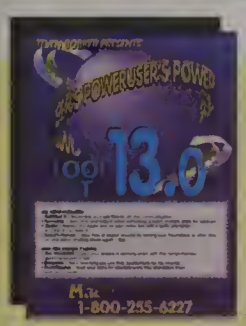

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Publisher: Connectix
UTI0297

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Requires: 2 MB RAM under System 6, 3 MB under System 7.
Publisher: Lotus Development
BUS0188

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ENT0383 $25.
Publisher: Centron Software

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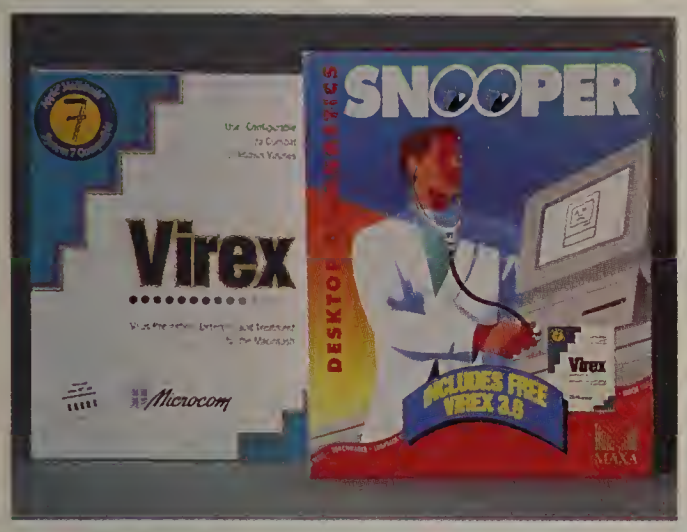

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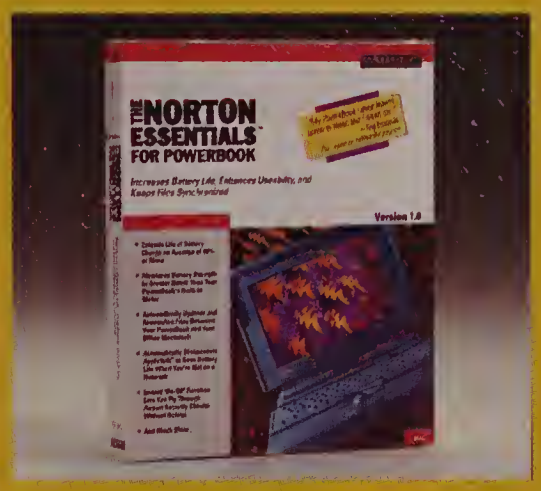
Requires: 2MB RAM.
Publisher: MAXA
UTI0337

$179



Norton Essentials for PowerBook

❼Norton Essentials for PowerBook is the most comprehensive utility package designed specifically to make the Macintosh PowerBook more efficient. It is a collection of 12 utilities that serve three main purposes: increase the life of the PowerBook battery charge an average of 40% or more, enhance general PowerBook productivity and useability, and keep files synchronized between a PowerBook and any other Macintosh. Features includes Airport Shutdown, Backlight Dimmer, Battery Gauge, Battery Saver, Instant Access for AppleTalk, Quick Notes, SyncIt! and much more-all quickly accessible from the control panel.
Publisher:
Symantec
UTI0341

$89

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ENT0461
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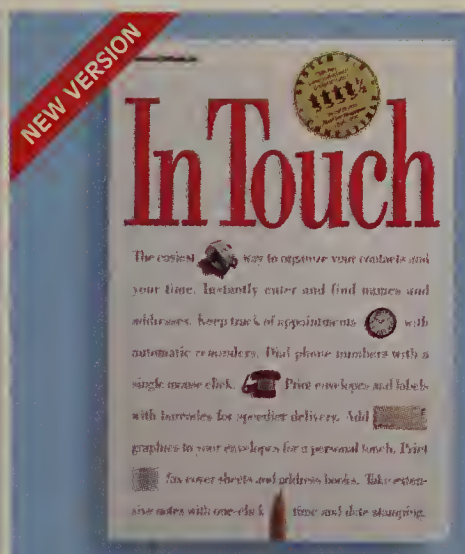

InTouch 2.0

❼InTouch 1.1 was rated "the best name-and-address DA for the Mac," MacUser Magazine, 4/91 (4.5 Mice rating). New InTouch 2.0 is even better! Version 2.0 adds an integrated reminder program, sorting, list view, phone books, fax cover sheets and much more. InTouch stores unlimited names, addresses, phone numbers and notes. The reminder program will notify you about that important meeting or phone call - it will even find the contact's number and dial it automatically. Sort your contacts into groups for easy printing of address books, mailing labels or envelopes. Share contacts with the lightning fast InTouch network.
Publisher: Advanced Software UTI0291
Also available: DocuComp II DTP0081 $99. and InTouch 2.0 Network 3PK UTI0307 $139.

$59

Fractal Design Sketcher™

❼Sketcher lets you faithfully duplicate the expressive line and texture of a soft lead pencil on rough sketch paper-or the luminous glow of oil paints that have been layered on a fine-weave canvas. Pencils, chalks, charcoals, calligraphy pens, spray paint and a variety of brushes for oils and water color are all available-along with a wide range of drawing surfaces. There's also photo retouching, cloning effects, type effects, "tracing paper" (it allows you to draw and paint over an existing image), extensive import/export capabilities, and support of any PostScript printer or QuickDraw devices.
Publisher:
Fractal Design Corp.
GRA0393

$99

Typestry 1.0

❼Pixar Typestry is exciting software which creates dimensional text from Type 1 and TrueType fonts. Users can move, rotate, scale and extrude words or individual letters and decorate their fonts in any number of interesting appearances. Ideal for creating images for logos, publishing, design, presentation graphics or multimedia. Typestry lets users work in a familiar 2-D environment but gives them amazing 3-D results. Typestry invokes RenderMan magic to transform a simple word into an extraordinary picture.
Publisher:
Pixar
TON0482

$189

PICTure This 2.0

❼PICTure This translates over 24 formats created on the PC, SUN, Amiga, X Windows, Apollo, Silicon Graphics, and Macintosh platforms to PICT/PICT2. Supported formats include PCX, TGA, CGM, TIFF, IFF, GIF, BMP, Silicon Graphics RGB, and more. This feature-rich user interface boasts such capabilities as batch processing, automatic file sensor, accurate translation of color, Save to Clipboard, a built-in viewer, and many options for customizing the output file. PICTure This is ideal for organizations that produce graphics, documents, and presentations in a multiplatform environment. XTND and Canvas Interface tools also available.
Publisher:
FGM Softworks, Inc.
GRA0352

$85

MacKids Preschool Pack 2.0

❼The MacKids Preschool Pack 2.0 uses color, graphics, and animation to teach basic skills, such as the ABCs, and the 1-2-3s, in a light and entertaining way. AlphaWorks teaches letter recognition and keyboard layout. Bar Math teaches the basic concepts of numbers using blocks. Concentration develops short term memory skills as players try to match picture cards. Connect the Dots teaches number and letter sequence, Counting 1,2,3 develops counting skills, and ShapeWorks teaches shape recognition. Now in color and System 7.0 compatible.
Publisher:
Nordic Software
EDU0142

$35

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UserLand Frontier 2.0

❼With UserLand Frontier, you don't have to choose between pretty icons and the power to customize and automate your Macintosh. For the first time, you can have power and ease-of-use. Frontier has all the development tools you need to get your scripts running quickly, including a full script debugger and structured symbol tables you can watch and edit while your scripts are running. When you're done, you can link scripts into Frontier's editable menu bar, or save them to the Finder desktop.

Publisher: UserLand
UTI0319

$189

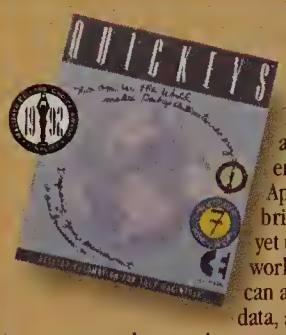
Infini-D 2.0

❼Create dazzling images with the power of Infini-D's Three-dimensional environment. The easy-to-use Infini-D, now in an awesome second generation! Infini-D 1.0 was the package that brought 3D graphics to the rest of us. Infini-D 2.0 combines this friendly interface with sizzling 3D power: Infini-D's incredible new shader and raytracer now can render scenes up to 500% faster! Instant conversion of EPS files into 3D objects, Infini-D's awesome metamorphosis capabilities, precise PICT mapping control, and extensive QuickTime support make Infini-D 2.0 the 3D package of choice for graphic arts and multimedia professionals.

Publisher:
Specular International
GRA0303

$699

QuicKeys 2v 2.1

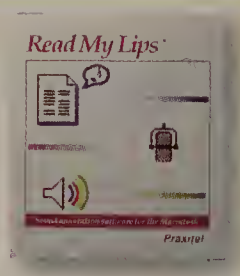


❼QuicKeys 2v 2.1 allows you to use System 7.0 Apple Events to communicate with, and control, other software. It enhances the capabilities of Apple Events aware software and bridges the gap to software not yet upgraded. QuicKeys 2v 2.1 works across applications, so you can ask them to find and process data, and send it back to you for use in your currently open document. Even better, you can set up a QuicKeys macro to do this for you automatically every week. QuicKeys is 32-bit clean, and supports System 7.0.

Publisher: CE Software
UTI0188

$94

Read My Lips 3.0



❼Record sounds in the Finder and create double-clickable files that playback the sounds, or attach QuickTime movies to your documents and play them back from within your documents. With System 7 and the new Read My Lips, you can record voice annotations and attach them to your documents, or use prerecorded sounds. Works with most word-processors, integrated DP and presentation applications.

Publisher: Praxitel
UTI0211

$75

Sketch! 1.5

❼Alias Sketch! combines powerful modeling, composition, texture mapping, perspective matching, lighting and rendering features into one complete package. Version 1.5 includes hole-cutting, 100% performance increase, enhanced texture map placement, and seamless integration with [illegible] image processing, RenderMan 3D modeling and animation programs.

Requires: Any Mac II; 8MB RAM; hard disk

Publisher: Alias Research
GRA0363

MacUser Editors' Choice Awards 1992 Finalist

$759

Public Utilities

❼Public Utilities automatically examines your hard disk while you work. It checks for common problems (bad sectors, corrupted data, and damaged directories) and alerts you when it finds them. It also suggests how to fix the problem (or at your option, corrects problems automaticaly). It scans disks at selected time intervals, or by manual command. Public Utilities is safe to use, even if the power goes off unexpectedly. The package includes the diagnostic utilities, and a disk optimizer (defragmenter), plus undelete, backup, security, and compression utilities.

Manufacturer:
Fifth Generation
UTI0325

$99

Smartcom II for the Mac

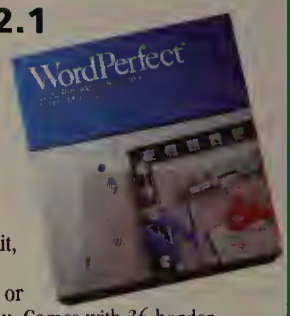
❼Activate the major functions with just a click on an icon. Connect to another Smartcom II user and exchange graphics. AutoPilot records frequently used sequences, and provides a simple interface for all the advanced features of Hayes Smartmodem and V-series products, including the ULTRA 96. Now supports System 7.0.

Requires: Any Hayes-compatible modem.

Publisher: Hayes
COM0015

$84

WordPerfect 2.1



❼WordPerfect® 2.1 represents graphic improvements to word processing. WordPerfect 2.1 has a graphics and drawing package built in. Incorporate graphics without leaving your document. You can create, edit, size, scale and crop graphic figures by clicking "graphics" or "draw" on the pull-down menu. Comes with 36 border styles, macro editor and stylesheets, new extended columns, improved text wrap, and it's System 7 savvy. The Styles commands let you define fonts, sizes, and text from newsletter headings.

Publisher: WordPerfect Corporation
WRD0041

$289

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BND0150

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PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. You'll find installation at home easy when you follow our FREE** step-by-step installation video instructions. Just open your Mac, slide out the main circuit board and plug in your SIMMs.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs — (2 @ $49 ea.)

The chart explains exactly what you need to achieve the desired level of performance.

To open your Mac Plus, SE, and Classics you'll need a specially designed tool — it's available from us as part of a handy tool kit for just $9.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single Inline Memory Modules). Each one megabyte SIMMs card holds eight top quality,

To upgrade a 4-socket Mac Plus or SE to this amount of memory	**Do this: (Install in multiples of two only) SIMMs must be 150ns or faster**
2 MB	Remove all four existing 256k SIMMs, install two 1 MB Simms, leave two sockets for future expansion.
2-1/2 MB	Remove only two 256k SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256k SIMMs with four 1 MB SIMMs.
To upgrade a 2-socket Mac Classic II or LC to this amount of memory	**Do this: (Install in multiples of two only) SIMMs must be 100ns or faster**
4 MB	Install two 1 MB SIMMs
To upgrade a 2-socket Mac LC II to this amount of memory	**Do this: (Install in multiples of two only) SIMMs must be 100ns or faster**
6 MB	Install two 1 MB SIMMs.
To upgrade a 8-socket Mac II, IIx, IIci, IIcx or SE/30 to this amount of memory	**Do this: (Install in multiples of four only) SIMMs must be 120ns or faster**
4 MB	Remove all four existing 256k SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256k SIMMs, install four 1 MB in remaining sockets.
8 MB	Remove all four 256k SIMMs, install eight 1MB SIMMs
To upgrade a 4-socket Mac IIsi to this amount of memory	**Do this: (Install in multiples of four only) SIMMs must be 100ns or faster**
5 MB	Install four 1 MB SIMMs.
To upgrade a 4-socket Quadra 700 to this amount of memory	**Do this: (Install in multiples of four only) SIMMs must be 80ns or faster**
8 MB	Install four 1MB SIMMs.
To upgrade a 16-socket Quadra 900 to this amount of memory	**Do this: (Install in multiples of four only) SIMMs must be 80ns or faster**
4 MB	Install four 1MB SIMMs.
8 MB	Install eight 1MB SIMMs.
12 MB	Install twelve 1MB SIMMs.

memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120ns SIMMs is $49.

Please call for the very latest prices and availability. Our sales staff will tell you what you need and help you make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100ns chip. The original Mac used relatively slow 150ns memory chips. The 68020 processor needs 120ns (or faster) chip, and the 68030 Macs like the speedier model.

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If, for any reason, you are dissatisfied with your Power User Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return this product, postage paid, in its original condition, with the original packaging and documentation.

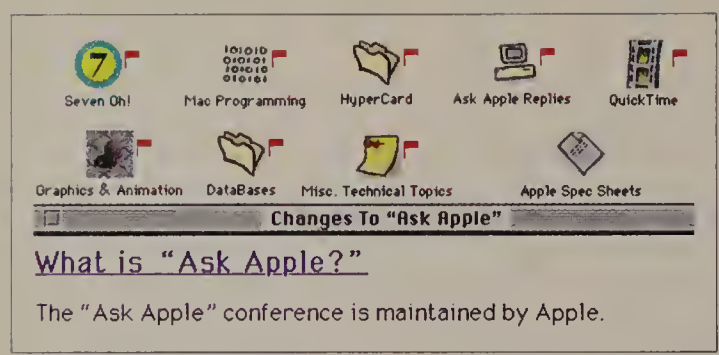
TWO YEAR WARRANTY.

MacWarehouse also guarantees its Memory Kits against manufacturer defects for two years from the date of purchase. We will repair the item or replace it at our discretion.

MW0393

* SIMMs prices vary. Call for latest information.
** Limited Offer! Free video with purchase of 2 or more SIMMs.

Circle 150 on reader service card



The Magic BBS in Ontario sports custom icons for the board's conferences. The BBS runs FirstClass software, which supports multiple fonts and colors in mail and conferences.

and the Dear Darla conference, which features a trained negotiator offering advice—a kind of online Ann Landers. OneNet's board of directors chooses interesting conferences, or discussion areas, from among member BBSs. Those conferences are then broadcast to other members via regional OneNet BBSs that act as hubs for specific areas. Regardless of their size or location, OneNet member BBSs can log on to the regional hubs to access the best conferences of the network as a whole, which benefits local callers nationwide.

By December 1992, the OneNet Member Network linked 90 BBSs and between 25,000 and 35,000 callers. The BBSs that make up the network range from small boards to the immense Planet BMUG. This diversity is part of the network's appeal. Autobahn (607/256-7595), in Ithaca, New York, is attractive to Trekkers and auto enthusiasts, thanks to the StarNet conference and several conferences on cars. Sysop Scott Mandell is a Cornell University student who aspires to become an auto designer. He's been running BBSs for 10 years—since he was 12.

Other interesting BBSs include Space Academy (407/632-4614) of Cocoa, Florida, a OneNet member that lures callers with its Space and UFO conferences; The Safe House (503/881-1733) of Ontario, Oregon, has a fascinating medical conference; while MacDaze (805/964-6320) of Santa Barbara, California, runs discussion areas for ham radio fans. Most of these conferences—and many more—are accessible from the OneNet Los Altos BBS and other OneNet members.

Channel Z (805/581-4975) is a small but lively board that emphasizes quality over quantity, according to sysops Bob Girard and Jan Lee. Girard discovered Macs after a motorcycle road-racing accident that left him a paraplegic. Channel Z belongs to both OneNet and MacUnion, a network of ten FirstClass-based BBSs located in Alaska, Pennsylvania, California, England, and elsewhere.

One highly regarded Macintosh BBS is Magic (416/288-1767), run by Mark Windrim of Ontario, Canada. If all goes well, Magic should be the largest Mac-based BBS by the time this hits print, with 22 telephone lines. It has 3000-plus enthusiastic callers. Once a registered Apple user group, Magic has dropped that status to support Windows machines as well as Macs. Enticing conferences include the Sex, Lies, and QuickTime area, with wide-ranging discussions about everything imaginable, and a Canadian version of Ask Apple, which differs from the conference on OneNet Los Altos—it has official Apple Canada support. Windrim says Magic is special because it's a community, not just a source of shareware.

Godfrey DiGiorgi, who runs a conference on OneNet Los Altos, has a simple explanation for the popularity of going online. "The pleasure of BBS systems, properly run, is that you can use this powerful technology to get to know other folks and share your thoughts with them on areas of common interest."

continues

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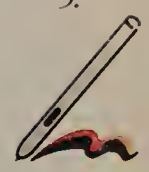
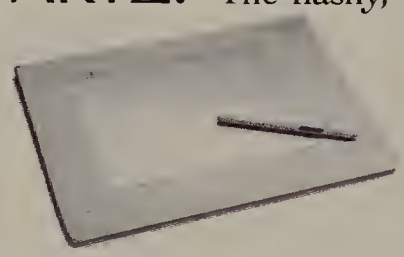
5.



DON'T CALL ORKIN.*

When the Mac first came around, everybody loved its *little rodent.* No cursor up. No cursor down. Man, what a handy device. Then people got into graphic arts. Whoops. *Mousetrap!* INTRODUCING ARTZ.™ The flashy, jammin', way cool ADB graphics tablet from Wacom. ArtZ simply *plugs into your ADB port* and lets you create graphics using a cordless, batteryless, pressure-sensitive stylus, about the size and weight of a fine pen. Now, creating art on a computer is as *natural* as creating art on a note pad, a canvas, or even a subway. To see just how flashy and way cool the ArtZ is, TAKE THIS SIMPLE TEST: *(1)* Cut out the mouse at the top of the page. Blow it up if you like. Now *(2)* *trace it* with the mouse on your computer. Then *(3)* print it, and *(4)* scurry on down with both to your local Wacom dealer. Don't know where one is? Just call *1-800-922-6613.* When you get there, *(5)* trace the mouse on an ArtZ. *Feels good,* doesn't it? Now *(6)* print it and *(7)* compare the two. OK? Now *(8)* pull out your pocketbook. You've been doing *mickey mouse art* long enough.



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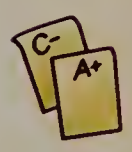

4.

8.

*For the mice that run on a Mac, you can't call for pest control. But for the mice that run on top of a Mac, and under a Mac, and in the cupboards and stuff, call these guys: Orkin Exterminating.

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Resources

MANY BOOKS CAN HELP YOU LAUNCH an online expedition. A very accessible, well-written guide for beginners is called *EcoLinking* (Peachpit Press, 1992). The author, environmental activist Don Rittner, subtitled this $18.95 book "Everyone's Guide to Online Environmental Information," and the BBSs listed in its appendix are geared toward science and the environment. But that comes later in the book, after Rittner covers online basics, global networks (FidoNet, BITNET, Usenet, Internet), and large commercial online services. (Rittner also runs a FirstClass-based BBS at 518/381-4430.)

The BMUG Guide to Bulletin Boards and Beyond (BMUG, 1992) is a mammoth resource headed toward 800 pages. This bible of online communications for Mac owners is in its second printing and fatter than ever. Although the $29.95 guide is intended for beginning and intermediate users, novices may find it a little daunting. That's not a complaint; the topic is complex and author Bernard Aboba, a BMUG sysop, has done a splendid job of creating a comprehensive and thorough reference. Both books can be ordered from CompuBooks at 512/321-9652 or 800/880-6818 (fax 512/321-4525).

Boardwatch Magazine (303/973-6038 or 800/933-6038) is an opinionated monthly that covers BBSs and online information services. Most BBSs are oriented toward users with DOS-based machines, and the magazine reflects that, but it covers Macintosh BBS news every month. A one-year subscription is $36.

There are far more Mac-specific BBSs than I can name in a single column. Many boards include lists of other Mac BBSs. For example, from San Francisco–based Macacademe (415/621-6567) you can download a list of 70 to 100 major Macintosh BBSs nationwide (it's in file area 23, called MacList). SoftArc, the publisher of FirstClass, runs a BBS called SoftArc Online (416/609-2250) that maintains an updated list of public-access boards running FirstClass and settings files for many of the boards. Regional publications such as *Computer Currents* and *MicroTimes* are another source of BBS listings.

Building Connections

WHEN MOST PEOPLE LIVED IN SMALL towns, they could walk the town square and greet their friends and neighbors, swapping tips and gossip. Today, BBSs and online services create electronic town squares, virtual town halls where age, race, and gender are less important than the force of an argument or its style and verve.

"We're passionate about this," says Converse about online communications. "It's a lot like the Mac was in 1984 and 1985. It's about information access and community. . . . Knowledge is what makes change possible." **m**

Research assistance by TOBY BRYCE.

Send nominees for sainthood to *Service Heroes, Macworld*, 501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop *Conspicuous Consumer* a line if a company is ignoring you.

Service Hero

Keith Kissane of Kirkwood, Missouri, writes in praise of Practical Peripherals. It seems a technician there was able to diagnose the problem with Kissane's modem in a matter of minutes. "The replacement ROM was received in the mail two days later," he writes, "with a return envelope for the outdated part."

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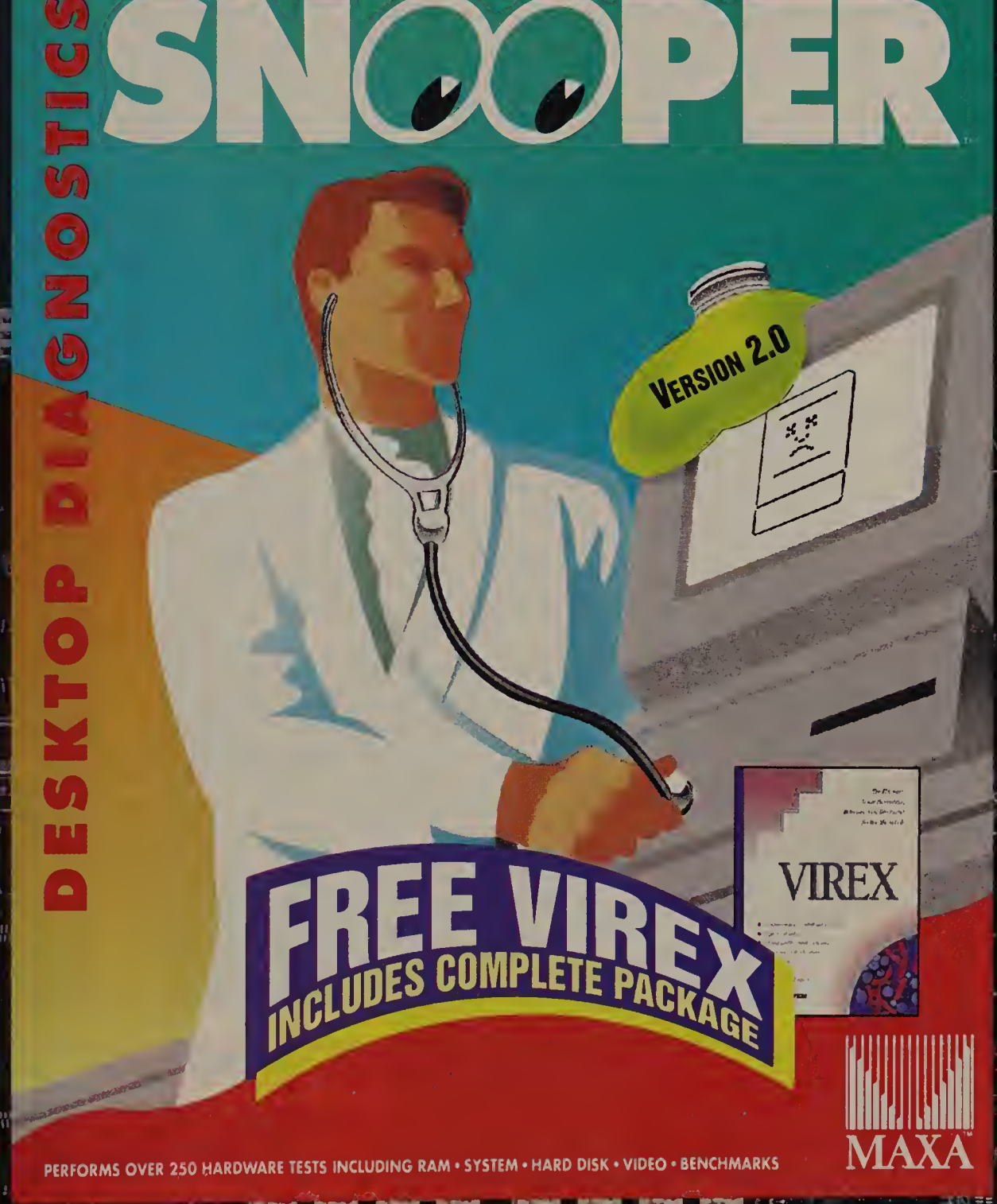

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Trinitron 19" Color ...$1998

14" Sampo Color.....$378
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- The SAMPO color and grey scale monitors are high quality dual page displays without the high cost!
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- Both displays support all Mac IIs', the SI, SE-30, SE and the LC

Sampo 14" Color $378.00
- Great picture quality, the Sampo is our sharpest 14" ever!.
- Plug compatible with the LC, SI, CI

Trinitron 19" Color System

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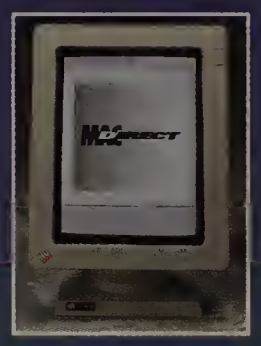
19" Trinitron System
- With 8 Bit interface $1998
- With 24 Bit interface $2598



NuDesign Full PageDisplay
- Grey Scale for CI, SI, Quadra....$398
- II, IIfx, FX, SE30, 1Bit $488

20" Sampo Color System
- With 8 Bit interface $1298
- With 24 Bit interface $1998

600 & 1200 DPI Color Scanners

Umax UC-630 With *PhotoShop*.....$1098.00

Transparency/Slide Scanner Option $798.00

Automatic Document Feeder $498.00
- Rated four mice by MacUser (Dec '91) ▪Rated fastest by MacUser
- "Boasts the highest vertical resolution..." Umax produced the best images..." MacUser
- "Umax excels in speed and color accuracy" MacUser

Umax UC-1200S With *PhotoShop* $3298.00

Transparency/Slide Scanner Option $898.00
- Incredible 1200 dpi scanning res. recognizes 1 billion colors internally
- Single-pass design increases scanning speed
- Includes Adobe Photoshop

Umax 600DPI Greyscale With *Typereader OCR Software, Ofoto and Publish It,* $898.00
- An incredible OCR package with over $1000 in software alone.

Scanner Special

Umax UC-630.....$1098
With Photoshop
- Rated 4 Mice by MacUser
- Rated Fastest by MacUser
- 8 1/2 x 14 Scanning area

Umax UC-1200S...$3298
With Photoshop

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Circle 58 on reader service card

Toshiba Specials

Toshiba 830MB 3.5" $1268
Toshiba 1200MB 3.5" $1698

- 11.5ms access time!
- Perfect for the Power User
- Internal 3.5" for most Macs

CONNER

The Drive That Apple Uses

Toshiba 830mb & 1200mb Drives

The Big 3.5" Drives

For 2 Years Conner has been one of Apple's largest hard drive suppliers!

Optical Drives & CD R

NuDesign 128mb 3.5" Optica
NuDesign 256mb 3.5" Optica

- MacWorld Editors Choice, November 1992
- Read/Write reliable storage

Ricoh 600mb HyperSpace Opti

- Read write reliable storage
- Great for a
- Includes cartridge

Toshiba 3301 CD-ROM Drive...

- Includes driver CD carrier and cable
- Ma

Maxtor Drives

	Internal	
120mb 3.5" LPS	$358	$
213mb 3.5" LPS	$548	$
760mb 5.25"	$1398	$1
1.2Gig 5.25"	$1648	$1

High Quality, Fast Backup A

NuDesign 2.1 Gig DAT
With Retrospect.... 1098.00 With Sof

NuDesign 5.0 Gig DAT
With Retrospect ..... 1498.00 With Sof

These drives combine a very fast and accurate mechanism fro DAT, with optional Retrospect 3.1 from Dantz Development. Ju

- *10.9mb per minute average backup speed*- Means fast backup and
- *Four-head Direct-Read-After-Write data verification*- Assures you
- *Automatic built in head cleaner*- Keeps your drive clean and error fr
- *SCSI II compatible interface*- Giving your drive compatibility with fut
- *45 watt switching power supply & a metal cabinet* - Assures stron
- *MTBF 50,000 hours*- Means that your NuDesign drive will handle yea

42, 85, 120 & 170MB Great Drive Values

These Low Power, Low Profile Drives fit into all Macs from the Classic to the Quadra!

The Low Profile, Low Power Conner drives offer a great option for the upgrading user. These drives install easily into any Mac from the classic to the Quadra 950! The 40 and 85 are great starter drives. Look to the 120 as the perfect step up from a 40mb and the 170 for excellent cost per megabyte .

		Internal	External
C 42 MB	3.5" LPS, 2 yr warr,150,000 MTBF	$208	$248
C 85 MB	3.5" LPS, 2 yr warr,150,000 MTBF	$228	$288
C 120 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	$298	$378
C 170 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	$338	$398

212 & 540MB Intense Performance!

The Low Power, Low Profile Conner 212mb also fits into all Macs from the Classic to the Quadra!

The 212 and 540 Conner drives are the top of the line for Conner in terms of performance and capacity. The 212 spins at 4500 RPM so that you get major performance in a very small package. Since the 212 is Low profile, Low Power it will also fit into any Mac. The high capacity 540 is the fastest drive we have tested and a perfect internal for the CX, CI, II and Quadra Series! Both drives are also available in compact or zero foot print externals.

		Internal	External
C 212 MB	3.5" LPS, 2 yr warr, 150,000 MTBF (4500 RPM, Fastest 212 avail!)	$448	$498
C 540 MB	3.5", 3 yr warr, 8.5 ms, 4500 RPM, , (Our Fastest Drive Ever!)	$1048	$1098

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Visa, Mastercard, Amex, COD, Telecheck Approved Checks, Gov., Corp., Univ., included. 30 Day Money back Guarantee covers drive products only. Return A

Toshiba Specials

Toshiba 830MB 3.5" $1268
Toshiba 1200MB 3.5" $1698

- 11.5ms access time!
- Perfect for the Power User
- Internal 3.5" for most Macs

MAC DIRECT

Specialists in Mac Storage

	Internal	External
Toshiba 830mb 3.5"	$1268	$1298
Toshiba 1200mb 3.5"	$1698	$1748

These Toshiba 3.5" drives are the perfect internals for the Mac Quadra, FX, II, CI, CX, SE and SE/30 computers. With up to 1.2 gigabyte formatted capacity you will not have to worry about running out of space for a long time. The 12.5ms access time and the 10MB/sec. throughput lets you access your information fast! The Three Year warranty and the great Toshiba name means not having to worry about reliability.

For a limited time all Toshiba hard drives include FWB Hard Disk Tool Kit!

Optical Drives & CD ROM

NuDesign 128mb 3.5" Optical .....$ 998
NuDesign 256mb 3.5" Optical $1798

- MacWorld Editors Choice, November 1992.
- 30ms access time
- Read/Write reliable storage
- Includes cartridge

Ricoh 600mb HyperSpace Optical.....$2898

- Read write reliable storage
- Great for archiving, color scans, etc.
- Includes cartridge

Toshiba 3301 CD-ROM Drive.....$538

- Includes driver CD carrier and cable
- MacWorld and MacUsers Highest Rated CD-ROM!

Maxtor Drives

	Internal	External
120mb 3.5" LPS	$358	$438
213mb 3.5" LPS	$548	$648
760mb 5.25"	$1398	$1498
1.2Gig 5.25"	$1648	$1748

Syquest 44MB & 88MB Removables

44MB Removable.....$448.00
88MB Removable.....$598.00

- 19ms Access time
- Both Drives include Cartridge
- Dual AC Outlets, 40 Watt power supply
- SCSI Select and 2 Year Warranty

High Quality, Fast Backup At A Super Price!

NuDesign 2.1 Gig DAT

With Retrospect ....1098.00 With SoftBackup.....998.00

NuDesign 5.0 Gig DAT

With Retrospect .....1498.00 With SoftBackup ...1398.00

These drives combine a very fast and accurate mechanism from the leading manufacturer of DAT, with optional Retrospect 3.1 from Dantz Development. Just look at these specifications...

- ***10.9mb per minute average backup speed***- Means fast backup and restores, you won't wait for your data.
- ***Four-head Direct-Read-After-Write data verification***- Assures your data will be there when you need it.
- ***Automatic built in head cleaner***- Keeps your drive clean and error free.
- ***SCSI II compatible interface***- Giving your drive compatibility with future Macs for years to come.
- ***45 watt switching power supply & a metal cabinet*** - Assures strong power and protection.
- ***MTBF 50,000 hours***- Means that your NuDesign drive will handle years of usage.

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Unbeatable Quality and Performance

Fujitsu 330, 425 and 520

MacWorld Editor's Choice

The Fujitsu 425 recently won the MacWorlds Editors choice award, this was for a combination of performance, quality and value. The Fujitsu 520 combines all of this plus the best dollar per megabyte available.

- **9 ms access times, 4400RPM Spindle Speeds and a 256k cache make these drives fast.**
- **5 year warranty, 200,000 Hours Mean Time Between Failure make them reliable! (That's 22.8 years of continuous 24 hour usage!)**

		Internal	External
330 MB	3.5" 9ms, 5yr warr, 200,000 MTBF	$878	$938
425 MB	3.5" 9ms, 5yr warr, 200,000 MTBF	$938	$998
520 MB	3.5" 9ms, Fast SCSI, 5yr warr, 200,000 MTBF	$998	$1068

Fujitsu 1.2 Gig and 2.06 Gig

Intense Speed, Huge Capacity, Serious Reliability

MacDirect has sold more Fujitsu drives into the Macintosh market than all of the other Mac peripheral companies combined. Give us a call and we will tell you why we feel Fujitsu is the perfect choice for your large storage needs!

- **MacWorlds Fastest 1.2 Gig drive (July 1991)**
- **The 2.06 Gig is our fastest drive ever!**
- **5400 RPM & Fast SCSI II, 10mb sec burst,**
- **5 year warranty! 200,000 Hours Mean Time Between Failure! (That is up to 22.8 years of continuous 24 hour usage!)**

		Internal	External
1.2 Gig	5.2.5" 11.5ms, 5yr warr, *MacWorlss Fastest Gig!*	$1498	$1598
2.06 Gig	5.2.5" 10.5 ms, 5yr warr, *5,4000RPM & Fast SCSI*	$2498	$2598

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NuDesign Specials

NuDesign 2.1 Gig DAT $998
NuDesign 5.0 Gig DAT $1398
NuDesign 256mb 3.5" Optical $1798
NuDesign 128mb 3.5" Optical $998

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NuDesign Optical

128mb 3.5" Optical Drive.....998.00
256mb 3.5" Optical Drive.....1798.00

The NuDesign 3.5" Optical is MacWorlds Editors Choice!

"Fast, inexpensive, good technical support, easy to use-this is a rare combination of qualities for a storage device."

MacWorld Editors in the November edition had great things to say about the NuDesign Optical, we think you will too. Give the drive a 30 day test and we're sure you'll be satisfied!

Totally Compatible ANSI/ISO Standard- Following the ANSI/ISO standard assures that your optical drive will always be able to interchange discs with other ISO standard drives.

Includes Hard Disk Tool Kit from FWB- This is the program recommended for Optical drives by MacWeek Editors.

Lowest Cost per megabyte- With 3.5 optical media at less than $49.00 per 128mb disc, your cost per megabyte is only 38¢, a fraction of the costs of Syquest or hard disks.

The NuDesign 3.5" Optical Drive

The NuDesign 2.1Gig and 5.0Gig DAT Drives

High Quality, Fast Backup At A Super Price!

NuDesign 2.1 Gig DAT

With SoftBackup 998.00
With Retrospect.....1098.00

NuDesign 5.0 Gig DAT

With SoftBackup 1398.00
With Retrospect.....1498.00

This drive combines a very fast and accurate mechanism with optional Retrospect 3.1 from Dantz Development. Just look at these specifications...

- ***10.9mb per minute average backup speed-Get to your data fast!***
- ***Four-head Direct-Read-After-Write data verification***- Assuring your data will be there when you need it.
- ***Automatic built in head cleaner***- Keeps your drive clean and error free.
- ***SCSI II compatible interface***- Giving your drive compatibility for years to come.
- ***45 watt power supply & a metal cabinet*** - Assures great power and protection.
- ***MTBF 50,000 hours***- Means that your NuDesign drive will handle years of usage.

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MACWORLD News

THIS MONTH: Photo CD Drives • Photoshop Goes Wild • Monster ARA Server • Capacious Bernoullis • PowerBook Storage

BY DAN LITTMAN AND TOM MORAN

Apple Redesigns Input Devices

Apple has introduced two input devices designed for more comfortable interaction with a Mac. The Apple Adjustable Keyboard and the Apple Desktop Bus Mouse II are scheduled to ship at the end of January. The $219 keyboard includes a separate numeric keypad and will be sold as an alternative to Apple's other keyboards. The mouse is expected to be bundled with all new Macs by June; it will also be sold separately for $79.

The new Apple Adjustable Keyboard marks a radical departure from previous keyboards from mainstream computer manufacturers. The idea of a split-angle keyboard is not new—patents for similar designs were issued as long ago as 1915. But Apple is the first large company to introduce such a keyboard; it allows users to adjust its right and left sides from 0 to 30 degrees.

In theory, at least, a split-angle design positions the keys in a more natural position for your wrists and fingers and should reduce the physical stress that may contribute to workplace injuries. According to researchers, however, many factors affect keyboard-related injuries, including typing force, so a split design alone may not prevent problems.

LUIS DELGADO

APPLE'S ERGONOMIC KEYBOARD LETS USERS ADJUST ITS POSITION, TILT, AND WRIST RESTS. THE KEYPAD AND APPLE'S NEW MOUSE ARE ON THE RIGHT.

Apple warns that it may take a few days to become accustomed to the new design. The adjustable keyboard's function and numeric keys reside on a separate pad, and popular word-processing keys like page up and home are low-profile buttons, not full keys. Apple says this makes them easier to find. But the nonstandard shape and height may make these keys less easy for touch-typists to use.

The new keyboard offers removable palm rests in front and adjustable vertical tilt bars at the back. It also includes keys that control sound volume and sound recording, reflecting Apple's push to multimedia computing. (These sound functions require an INIT that comes with the keyboard.) The keyboard requires an ADB port and System 6.0.7 or later.

The new Apple Desktop Mouse II features a curved design, similar to that of Logitech's MouseMan. Unlike the MouseMan, the new Apple mouse is curved so that both left-handed and right-handed people can use it. The curvature lets the mouse fit more snugly in your palm, which gives your hand the support that the original Apple mouse lacks. Apple has increased the size of the mouse button to make it easier to press. The mouse's physical resolution is 200 counts per inch, typical for mice. The mouse works with any Mac that has an ADB port.

—GALEN GRUMAN

Software for Color Scanners

WHEN APPLE SHIPPED its gray-scale OneScanner, it came with Ofoto, Light Source's scanner software for novices. Apple will ship its new color scanner with a version of the color-capable Ofoto 2.0 that works only with Apple's scanner (see "New from Apple: 3 Printers and 1 Scanner"), while Light Source will sell

continues

OFOTO 2.0 HAS A MENU ITEM WITH SEVERAL AUTOMATIC COMMANDS FOR ADJUSTING COMMON PHOTO PROBLEMS.

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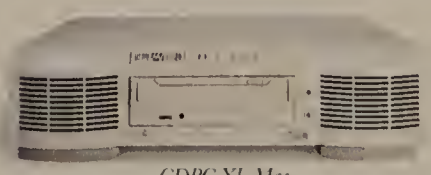
Pro AudioSpectrum 16 Mac



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Circle 73 on reader service card

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There are dozens of products to help you transfer files between Macs and PCs. But only one choice that works with them all for complete, effortless file translation. MacLinkPlus.

MacLinkPlus is the most comprehensive file translation package available today. Over 700 conversion choices translate files to and from all popular word processing, spreadsheet, database and graphics applications, running under Macintosh, MS-DOS or Windows. File conversion is completely automatic. Just drag a file onto the MacLinkPlus icon to translate it, or launch our translators with a single point-and-click. Our built-in file recognition lets you convert Mac or PC files without even knowing their file type.

MacLinkPlus works with all Mac to PC file transfer products, including disk mounting utilities such as Apple's new Macintosh/PC Exchange, floppy disk drives such as DaynaFILE or network software such as LanTastic and NetWare. If you do not already have a disk mounting utility or some other form of file transfer, we can help you there too. We include a DOS disk mounting utility with all of our MacLinkPlus products. If you need to hook the two machines up directly using a cable or modems, then our MacLinkPlus/PC product is for you. It includes our full library of translators as well as serial cable and communications software for use with modems. MacLinkPlus/Translators is a subset of MacLinkPlus/PC, containing the full translator library and DOS disk mounting software.

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Circle 36 on reader service card

a $395 version of Ofoto 2.0 that supports most color scanners on the market.

Ofoto 2.0 color capabilities are aimed at capturing and correcting color images. It can remove the color cast caused by shooting film that is inappropriate for the lighting conditions; can sharpen images that were shot out of focus; and can be trained to capture the best scan for the final output device. Most functions are highly automated, but controls are available for users who know precisely what they want to achieve.

Version 2.0 also has better gray-scale capabilities, including improved density-range mapping, control over midtones, and improved sharpening. Light Source, 415/461-8000.—D.L.

SCOTT PETERSON

THE POWERBOX FROM ADAMBYTE ATTACHES UNDERNEATH A POWERBOOK 160 OR 180.

Storage to Go

For PowerBook users who need to cart around box-loads of data, a new company called adambyte has announced the powerbox, a battery-powered storage device that imitates the look of the PowerBooks. The powerbox contains a 200MB Quantum or Maxtor hard drive plus a Teac tape-backup drive that uses DC-2155 cartridges to store 155MB of data. The powerbox weighs only 4 pounds; it measures just 1.4 inches high and fits underneath the PowerBook 160 or 180. The powerbox's built-in nickel-cadmium battery can run the hard drive for up to 2 hours. If you connect the PowerBook to the drive with a power cable that comes with it, both batteries can recharge as you work. The 200MB powerbox lists for $1899; a 500MB version, for $2499. adambyte, 415/988-1415.—TOM NEGRINO

TREND

Messaging Mobile Macs

Motorola has been diligently laying the groundwork for wireless long distance communication, installing a nationwide infrastructure; creating software development tools; and of course, marketing pagers, cellular telephones, and other wireless gizmos.

Now Motorola has wireless products for the Mac. Motorola's one-way wireless messaging service, EMBARC (Electronic Mail Broadcast to a Roaming Computer), can reach PowerBooks equipped with Motorola's News Stream receiver in more than 200 cities. EMBARC can send text or binary files and can separate and then recombine files bigger than the 1500-character message limit. To reply to messages, users must hook up to a normal modem.

EMBARC is $395 for the receiver and software, plus $15 per month, which includes a daily broadcast of news from *USA Today*. The cost of sending a message varies from about $1.50 to more than $30, depending on how quickly it is delivered and whether the sender knows where the recipient is located. Sending a message to a group costs the same as to one person. Motorola's EMBARC division is at 800/362-2724.—D.L.

PETER HOEY

News

Crystal TOPAS Phones Home

Crystal Graphics has announced Crystal TOPAS, a new version of MacTOPAS, Crystal's 3-D modeling, rendering, and animation package, which was previously marketed by AT&T.

Crystal TOPAS is a professional-level product that was designed for broadcast-quality output. The new version will have a more Macintosh-like interface.

Crystal is also breaking most of TOPAS's functionality out into lower-cost modules. Crystal Designer will offer TOPAS's advanced modeling tools, such as spline-based surface manipulation, and rendering effects, including texture mapping, shadows, and fog. Desktop Animator will include Designer and will add disk-based animation capabilities, but Animator will lack TOPAS's professional video-output features.

OUCH! PIG MODELED AND RENDERED IN CRYSTAL TOPAS. SHARDS WERE CUT AWAY USING TOPAS'S DRILL FEATURE.

Pricing is tentatively set at $995 for Designer and $1995 for Animator. Crystal Graphics, 408/496-6175.—CARLOS DOMINGO MARTINEZ

PowerBook Makes New Friends

APPLE'S POWERBOOK/DOS Companion, a specially priced bundle of hardware and software, makes it easier for Macintoshes to exchange files with DOS and Windows machines. The bundle includes Apple's Macintosh PC/Exchange software, which enables you to use DOS floppy disks in a PowerBook; MacLinkPlus/PC software from DataViz, which translates a variety of DOS or Windows spreadsheet, word processing, and graphics files to and from Macintosh format; GDT Softworks' PowerPrint, a serial-to-parallel cable adapter and printer-driver software that links to more than 1000 kinds of DOS printers; and James Engineering's MacVGA, cables that connect the PowerBook 160 or 180 to VGA and SuperVGA monitors. The PowerBook/DOS Companion has a suggested list price of $219; the same products bought separately cost $472 list. Apple, 408/996-1010.

—TOM NEGRINO

TURKEY SHOOT

DESIGN FLAWS NOTED

Mac IIvx and System 7.1 It might be a good time to buy stock in utilities companies—like Suitcase publisher Fifth Generation Systems or Master Juggler publisher ALSoft—because IIvx owners are discovering that, without such utilities, the new machine and the new System it requires max out at 128 fonts.

Aldus FreeHand 3.1 If you hang back with System 7.0 so you can use lots of fonts, you'll discover that FreeHand imposes its own limit on fonts—either 175 or 256, depending on whom you ask.

Macworld will send you a Turkey Shoot T-shirt if we shoot your turkey in this column. See *How to Contact Macworld*.

Now Your Mac Does Windows Too.

New SoftPC® with Windows™ not only lets your Macintosh run Windows applications, it's been accelerated to really shine with Microsoft Windows 3.1.

SoftPC is the software only solution that lets you run more than 50,000 standard and custom DOS applications on your Macintosh.

And now, SoftPC with Windows, the newest member of the SoftPC family, *includes Windows installed and ready to run.* Plus, we've added special optimized drivers to give you the performance you need.

So while a PC is just a PC, SoftPC with Windows makes your Mac *both* a Mac *and a PC with Windows.*

At a click, you can run any standard-mode Windows application you want. VGA graphics too, of course.

Click again, and you're back on the Mac track.

Ask for "SoftPC with Windows" where you buy Mac software, or call us for the name of your nearest dealer. After all, if you can run Windows and have your Mac too, you've got a very clear advantage.

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Circle 72 on reader service card

Printer Language Switching

Extended Systems has released a printer-switching system that allows Macs, PCs, and workstations to connect to many makes and models of PostScript printers and dynamically switch between the PostScript and PCL languages. The BridgePort ESI-2679C, priced at $595, supports dynamic switching on Hewlett-Packard LaserJet III and LaserJet II, Lexmark 4029, and Apple LaserWriter IIf and IIg printers. Extended Systems, 406/587-7575 or 800/235-7576.

—JONATHAN CASSELL

PETER HOEY

News

Screaming through the Ether

MOTOROLA'S Altair Plus II wireless Ethernet system connects computers and related machines into a network wherever wiring is too expensive or impractical. Using low-power radio transceivers, the wireless network routes data as fast as 5.7 million bits per second, according to Motorola. To set up the system, you mount control modules on cubicle partitions or walls and connect computers, printers, or other devices to desktop send/receive modules that transmit network signals to the control units. Each control module ($4995) handles up to 50 Ethernet addresses and can connect to existing Ethernet cabling. Each send/receive module ($1195 for 10-Base-T; $1295 for thin- or thick-coaxial cable) connects up to 8 machines to the network. Motorola, 708/632-7211.—TOM NEGRINO

VIRUS WATCH

CURRENT VIRUSES, TROJAN HORSES, AND WORMS

T4-A, T4-B

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 10/92
INFO: Initially discovered in a game called GoMoku
IMPACT: Both versions of T4 damage system files and applications

ChinaTalk

TYPE: Trojan Horse
FIRST LISTED IN VIRUS WATCH: 10/92
INFO: ChinaTalk is an INIT that comes with a read-me file that claims it provides a female voice for MacinTalk
IMPACT: Deletes the contents of disk drive on restart

INIT 1984

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 8/92
INFO: Infects INITs; becomes active only on Friday the 13ths
IMPACT: Destroys files and changes file and folder names and attributes to random garbage

Code 252

TYPE: Virus
FIRST LISTED IN VIRUS WATCH: 8/92
INFO: Displays a message telling user it is destroying contents of hard drive
IMPACT: After displaying message, it deletes itself without causing damage; infected Macs may behave erratically

Instant Cartography

Drawing maps with Aldus FreeHand or Adobe Illustrator will become as obsolete as setting type in hot lead when cartographers, illustrators, graphic designers, and other people who need to create accurate maps turn to map-generators like Geocart.

Geocart contains a database of political boundaries and physical features of much of the world. A user selects what part of the world and what features to draw, chooses a projection (a method of flattening the earth's spherical surface for computer screen or paper), assigns colors if desired, and Geocart makes a map. Geocart produces PICT, EPS, or Illustrator-compatible files. Geocart is easy to use, but for professional cartographers it provides more than 100 projections; exacting control over the *graticule* (the grid of latitude and longitude lines); and other sophisticated tools. The program can also import map geometry in several formats including, with some tweaking, raw PostScript. Geocart is $499 from Terra Data, 212/675-2971.—D.L.

GEOCART'S ARMADILLO PROJECTION OF THE EARTH. THE ICON MENUS HOLD BETWEEN 11 AND 30 PROJECTIONS EACH.

TREND

New Marketing Paradigm

Companies that produce expensive, complex products face a tough marketing challenge. Making a sale usually means working with several people at a potential customer site, each of whom is on a different decision cycle and needs different information about the product.

To teach companies how to wend their way through such environments, R. M. Dudley combines consulting services with its Sales Navigation software. Dudley clients establish a presales force that ferrets out decision-makers at a potential customer site and provides them with all relevant information—before sending in the salespeople to close the deal.

Features of the Sales Navigation software itself range from generating form letters and scheduling callbacks to performing a quantitative estimate of when it's time to try to close a sale and analyzing afterward why a sale succeeded or failed. The system can easily be modified by companies that have sales procedures in place.

Software and consulting are usually more than $10,000. R. M. Dudley, 415/697-1650.—D.L.

BRIAN SMALE

BO KEYSLAY, EXECUTONE'S DIRECTOR OF PRODUCT MARKETING. EXECUTONE USES SALES NAVIGATION TECHNIQUES.

Print Pack Portal to PC Printers

FOR A LONG TIME, Mac owners who wanted to take advantage of the big choice and low prices for PC printers had to scout around for third-party adapter products like those from GDT Softworks. Finally Apple has put out its own $99.95 Macintosh Print Pack, which lets Macs print documents on a wide variety of DOS printers. The Print Pack includes cables and printer drivers for most portable and wide-carriage printers that use the DOS-standard Centronics parallel port. The Print Pack supports TrueType, Type 1 PostScript, and bitmapped fonts, as well as PICT and TIFF graphics, portrait or landscape printing, different paper sizes, and enlargement or reduction. The package requires System 7.1; 4MB of RAM are recommended. Apple, 408/996-1010.

—TOM NEGRINO

What Makes Our 11x17 Printer Better Than The Rest?

600 dpi, 800 dpi, 960 dpi, Speed, Flexibility, Upgradability and Support... oh yeah, Price.

When shopping for an 11x17 PostScript® compatible printer, we realize you have a lot of choices. And while many vendors lay claim to being the best, Xante prefers to leave the judging to you. We invite you to compare our printer with the rest. With the *Accel-a-Writer 8100*, you'll get...

11x17/A3 Printing - The large page size support will give you a new level of flexibility in page layout and printing.

True High Resolution - The *Accel-a-Writer 8100* supports true 600 x 600 dpi for incredibly sharp text and graphics. And you have the option to nearly double or triple the resolution with our 800 x 800 dpi and 960 x 960 dpi upgrades.

High Speed Printing - The *Accel-a-Writer 8100* is built for speed with the AMD 29000 RISC processor, 12 MB RAM, Xante's *Advanced Memory Management*, and Canon®'s 8 page per minute LBP®-BX laser print engine.

Flexibility - Sharing among Mac® and PC users is simple with simultaneously active AppleTalk®, Parallel and Serial interfaces. You'll get font flexibility with 35 Type 1 fonts plus the ability to download up to 30 more permanently on the controller with Xante's *Virtual Disk Technology*.

Quality Assurance Guarantee

Best Price - The *Accel-a-Writer 8100* gives the highest quality in output, advanced printing technology and flexibility. But the best thing is you won't have to pay a premium. In fact, the *Accel-a-Writer 8100* is only $3,995.

Quality Assurance Guarantee - Your purchase will be protected with toll-free customer support, a one year warranty and a 30-day unconditional money back guarantee. Compare, then call us directly.

	Accel-a-Writer™ 8100	CalComp® CCL-600	NewGen® TurboPS 660™B	QMS® 860 Print System
Standard Resolution	600x600 dpi	600x600 dpi	600x600 dpi	600x600 dpi
Optional Resolution	800 & 960 dpi	None	800 dpi	None
Standard RAM	12 MB	2 MB	12 MB	12 MB
Virtual Disk Technology	✓			
Enhanced Gray Scale	✓			
Price	$3,995	$3,995	$5,495	$4,595

Statistics as of 10/92

1-800-926-8839
Ext. 2102
Fax 205-476-9421

XANTE
Innovations In Output

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Circle 1 on reader service card

Tabulating Data

Market researchers, social scientists, and others with reams of incomprehensible numbers can benefit from doing cross-tabulations, a way of summarizing data and finding relationships among variables.

TabHouse is a dedicated cross-tab package. It can read data in delimited or fixed-length-field format, calculate summary statistics, and handle 32,000 variables and unlimited records. The program supports weighting variables (that is, changing the impact some values have on calculations); can cross variables up to three levels deep (for example, convert gender and marital-status data into single males, married males, single females, married females); and can handle multiple-response variables. TabHouse provides some controls over its tables' appearance.

The current version, 1.1, lists for $695. Version 1.5 (also $695) will add more statistical and page-design capabilities and include a utility to create data entry forms for questionnaires and surveys. Pericles Software, 419/872-0966.—D.L.

ROBERT PERRY

SIGMA DESIGNS' COLORMAX 15 IS A 15-INCH MONITOR THAT'S THE SAME COLOR AS A POWERBOOK.

PowerBook Viewing Options

FOR POWERBOOK 160, 180, or Duo users who need more screen real estate when working at their desks, Sigma Designs has developed two new monitors—with cases color-coordinated to match the PowerBooks. The ColorMax 15 uses the new PowerBooks' built-in video output to deliver 8-bit (256-color) video on a 15-inch screen. The PageView GS is a 15-inch, full-page portrait monitor that provides up to 16 shades of gray.

The ColorMax 15 lists for $899; the PageView GS is $599. The ColorMax comes with an antiglare/antistatic coating, which you can have on the PageView GS for an extra $50. Both monitors offer a tilt/swivel stand, and of course, if you don't have a PowerBook, they work with any other video-ready Macintosh model. Sigma Designs, 510/770-0100. —TOM NEGRINO

Mapping the Network

Two publishers of network-management software are bringing new products to market.

Neon Software's LANsurveyor will gather information on AppleTalk devices throughout an internet using Apple's new implementation of the Simple Network Management Protocol (SNMP) standard. LANsurveyor draws a network map showing all devices and the hierarchical relationships of network zones; maps can be labeled, and collapsed or expanded like an outline. A polling feature lets network managers test device response times, and when devices drop off the net, LANsurveyor can ring an alarm or send an E-mail or pager message. The program will cost $395 for small networks and $695 for big networks. Neon, 510/283-9771.

Like LANsurveyor, Sonic Systems' Radar 3.0 draws a map of the network. It does not use SNMP, but has its own device-testing technology. Radar can test network performance with its "pinging" feature. Radar comes with Radar Responder, a utility that lets network managers see what is installed on Macs, download or delete files, restart a Mac, and so on (users can configure Radar Responder to keep snoopy managers out). Radar is $499. Sonic, 408/736-1900.—D.L.

News

TREND

Kodak's Color Matcher

New software and smarter hardware is making it easier for the publishing world and the printing world to coordinate their colors. Last year Electronics for Imaging released Cachet, Macintosh software for managing scanners, monitors, and output devices to keep colors consistent as images move through all stages of publishing. Now Kodak is entering the color-matching market with ColorSense, a less expensive product ($495 with a photometer—the hardware device that reads the color off a monitor—compared with $595 for Cachet without photometer) that, Kodak hopes, will appeal to users with less-sophisticated and less-expensive output devices.

ColorSense comes in several pieces: the Configure application, which is for specifying and calibrating equipment; the Manager application, which simulates how an image will print on

ROSEMARY WILTON

different devices and supports modifying its colors; and Extend, which provides color management inside other applications. ColorSense supports TIFF, PICT, and Photo CD. Kodak can be reached at 716/724-1021.—D.L.

DESKTOP LIBRARIAN

This month we crack open two books for Mac beginners.

- *Macs for Dummies*, by *Macworld* contributing editor David Pogue (1992, $16.95). This humorous guide starts off with a section called "For the Absolute Mac Virgin," which gets the reader through basics such as starting up the Mac. Part 2 includes a chapter called "Faking Your Way Through the Top Ten Programs." Part 3 discusses "When Bad Things Happen to Good Machines." Full of tips, clear explanations, and little touches like the Technical Stuff icon, which alerts you to sections you may want to skip over. Includes an index and "Techno-Babble Translation Guide." IDG Books Worldwide, 415/312-0650.

TOM GIBSON

MACS FOR DUMMIES (FRONT) AND THE FIRST BOOK OF THE MAC, SECOND EDITION.

- *The First Book of the Mac*, second edition, by Carla Rose and Jay Rose (1992, $18.95). This beginning tutorial's first chapter covers some Mac history and philosophy, the second chapter shows you how to start up and other basics, and other chapters explain Mac editing techniques, dressing up text documents, processing pictures, and other applications including spreadsheets and databases. The "Impractical Applications" chapter talks about games and other fun software. Offers lots of tips and real-world uses for applications. Includes an index and "Glossary for Non-Hackers." Alpha Books, 317/573-2510 or 800/428-5331.—T.M.

America's Most Popular Macintosh Workshops Now On Video

Speed Learning

Most people are amazed. They need training. They hate reading manuals and they don't want to pay huge sums for local Macintosh training. At first they feel like giving up in frustration. Then someone tells them about MacAcademy's unique and valuable Video Training Library.

The Price

The first benefit of the training library is the price. Each video is only $49. While other training companies have raised their prices out of sight, MacAcademy videos cost the same as five years ago.

Selection

The next bit of good news is the huge selection of training videos available from MacAcademy. Below you will find a sampling of the videos currently available.

Quality

No blurry screens. No paid actors reading scripts. No frills. Each MacAcademy video features one of our top trainers recreating the classroom atmosphere and teaching you each program from start to finish.

Effectiveness

Many of our customers say our videos cut their learning curve by up to 70%! Videos give you the ability to actually *see* each technique on the Macintosh screen. The video allows you to replay, to fast-forward, or to find any particular technique immediately by using our unique counter system.

Flexibility

MacAcademy videos make excellent learning libraries for companies, schools, individuals, and clubs. They can be watched over and over and can even be projected to large groups. New employees can take them home and learn on their own.

Reputation

MacAcademy is the winner of the 1992 ***MACWORLD World Class Award***. Readers chose MacAcademy as the top trainer in the nation. No other organization even came close! When it comes to training, MacAcademy has the best reputation in the business. You deserve World Class training at an extremely low price. In addition, all videos carry a complete 30 day guarantee.

30 Day Money - Back Guarantee. *If you're not totally satisfied simply send the videos back for a full refund.*

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Call 800-527-1914 with credit card or purchase order info or mail or FAX your order to the address and number below. Add $3 plus $1/video shipping and handling.

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- Adobe Illustrator 3.2 Video #2 ☐
- Adobe Illustrator 3.2 Video #3 ☐
- Adobe Photoshop Video #1 ☐
- Adobe Photoshop Video #2 ☐
- Adobe Photoshop Video #3 ☐
- Aldus Freehand Video #1 ☐
- Aldus Freehand Video #2 ☐
- Aldus Freehand Video #3 ☐
- Aldus PageMaker Video #1 ☐
- Aldus PageMaker Video #2 ☐
- Aldus PageMaker Video #3 ☐
- Aldus PageMaker Video #4 ☐
- Aldus Persuasion Video #1 ☐
- Aldus Persuasion Video #2 ☐
- Aldus SuperPaint Video #1 ☐
- Aldus SuperPaint Video #2 ☐
- Aldus SuperPaint Video #3 ☐
- Claris FileMaker Pro Video #1 ☐
- Claris FileMaker Pro Video #2 ☐
- Claris FileMaker Pro Video #3 ☐
- Claris MacDraw Pro Video #1 ☐
- Claris MacDraw Pro Video #2 ☐
- Claris MacProject II Video #1 ☐
- Claris MacProject II Video #2 ☐
- Claris MacProject II Video #3 ☐
- Claris MacWrite II Video #1 ☐
- Claris MacWrite II Video #2 ☐
- ClarisWorks Video #1 ☐
- ClarisWorks Video #2 ☐
- ClarisWorks Video #3 ☐
- ClarisWorks Video #4 ☐
- Deneba Canvas Video #1 ☐
- Deneba Canvas Video #2 ☐
- Deneba Canvas Video #3 ☐
- Claris HyperCard Video #1 ☐
- Claris HyperCard Video #2 ☐
- Claris HyperCard Video #3 ☐
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- Lotus 1-2-3 Video #2 ☐
- Lotus 1-2-3 Video #3 ☐
- Macintosh (6.0 or 7.0) Video #1 ☐
- Macintosh (6.0 or 7.0) Video #2 ☐
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- Microsoft Excel Video #2 ☐
- Microsoft Excel Video #3 ☐
- Microsoft Excel Video #4 ☐
- Microsoft Excel Video #5 ☐
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$49ea.

Videos can be updated upon release of new software versions for only $14.95.

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Circle 106 on reader service card

News

Lapis Updates Color Board Line

FOR OWNERS OF LCS, LC IIs, and Performa 400s who have coveted the 24-bit color images displayed by more expensive Mac models, Lapis Technology has introduced the ProColorServer 24 board, which supports 24-bit color on monitors as big as 17 inches. The $599 board supports 8-bit color on screens of up to 21 inches. Two variations of the board work with the Mac SE/30 and IIsi and the Mac II family, Quadras, and Performa 600s.

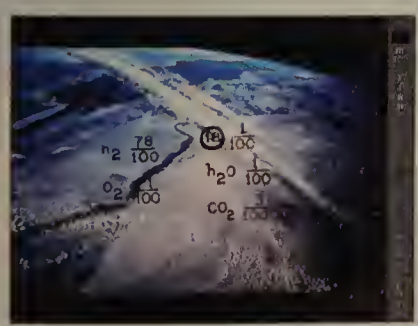
Three other families of display boards from Lapis work with the same models. The ProColorServer 24X ($699) boards display 24-bit color on 17-inch screens, or 16-bit color on monitors up to 21 inches. The ProColorServer 8 16, priced at $499, supports 8-bit color on up to 21-inch displays and 16-bit color on displays up to 17 inches. The ProColorServer 8, priced at $399, can support 8-bit color on 17-inch displays. Lapis, 510/748-1600.—JONATHAN CASSELL

PLAYING WITH DATA IN DATA DESK 4.0. SEVERAL VIEWS OF MULTIDIMENSIONAL DATA ON CAR CRASH INJURIES.

Message to the Stars

For 15 years earthlings have delighted as the two Voyager spacecraft launched in 1977 sent back thousands of photos of Jupiter, Saturn, Uranus, Neptune, and other nearby neighbors. The ships are leaving us behind and won't be sending any more postcards, but with each goes a carefully conceived record of Earth—an interstellar message in a bottle.

Warner New Media has just republished the Voyager record as Murmurs of Earth, a $59.99 package with two CDs containing music of many countries and speech in many languages (plus a few whale songs), photographs of Earth, and the schematics scientists designed to help our neighbors make sense of the disc. Murmurs of Earth includes a book Carl Sagan and other Voyager record designers wrote about the project. Warner New Media, 818/955-9999.—D.L.



EGYPT AND THE SINAI PENINSULA. SUPERIMPOSED NUMBERS ARE TO DESCRIBE EARTH'S ATMOSPHERE TO OTHER WORLDS.

Data Desk Updated

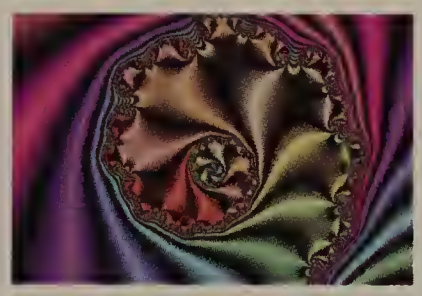
DATA DESK IS BILLED by its publisher as an exploratory-data-analysis tool, designed for users who may not know statistics but who do know what they want to find in their data. Data Desk simplifies wading through data by quickly creating graphs and plots to give users a feel for what the data contains.

Version 4.0 has a new batch of statistical features, including a multivariate general linear modeler that provides regression, ANOVA, ANCOVA, and repeated measures analyses; no limit on the size of data sets; and improved presentation and publishing features. Data Desk version 4.0 lists for $595. Data Description, 607/257-1000.—D.L.

Adding onto Photoshop

Harvard Systems is publishing tools that increase the capabilities of Adobe Photoshop 2.0 or 2.5. Called Kai's Power Tools (KPT) after one of the Harvard Systems founders, the tools come in a floppy disk–version and a CD ROM version.

The $149 floppy disk set has 33 add-ons including Texture Explorer, a utility that allows users to generate textures, materials, and backgrounds for use in Photoshop images; and Gradient Designer, for creating complex gradients with up to 500 colors and alpha-channel control. The $295 CD version includes the contents of the floppy disk version and adds more utilities, an online book of Photoshop tips, 1000 still images, and some 3-D animations as well. Harvard Systems, 310/392-8441.—D.L.



TOP: A GRADIENT FRACTALIZED IN KPT'S JULIA EXPLORER 2. BOTTOM: CHANNEL OPERATIONS, EMBOSSING, AND MORE.

TREND

Photo CD–Compatible CD ROM Drives

Toshiba and Mirror have introduced SCSI CD ROM drives that are compatible with the multisession Kodak Photo CD standard. Photo CD scans photos taken on 35mm film and stores them as high-resolution images on a CD ROM. Each additional roll of film written to the CD ROM creates a new session; older drives can read only the first session of a multisession CD ROM.

The Toshiba XM-3401, a double-speed drive, boasts an access time of 200ms, which is faster than Apple's double-speed 300CD drive. Toshiba's external drive lists for $895; an internal unit is $695; the Mac interface kit that contains software drivers and cables costs $115. The $599 Mirror external CD ROM drive has a rated access time of 325ms, and comes with stereo RCA jacks, a headphone jack, and volume control. The Mirror drive ships with driver software and a desk accessory for playing audio CDs. Toshiba, 714/583-3000; Mirror, 612/633-4450 or 800/654-5294.—TOM NEGRINO

RICHARD RETHEMEYER

TOSHIBA'S XM-3401 CD ROM DRIVE (TOP) AND MIRROR'S CD ROM DRIVE ARE BOTH PHOTO CD–COMPATIBLE.

JUST FOR FUN

Just Joking

No, really, the name of the program is Just Joking, and it's a compilation of more than 2800 jokes, one-liners, and funny quotes. Just Joking is part of WordStar International's Writing Tools Library of writers' references. The items are sorted into 250 topics, and you can search them by keywords if you're looking for that perfect segue to brighten up your address to the Committee for Extreme Boredom. And if the joke doesn't shake them up, you can use the "free surprise" that comes with each package. (At *Macworld* the surprise varied from box to box, from Groucho glasses to a Whoopee Cushion.) The jokes are cross-referenced by their originator, and you can add new jokes and new topics. So far my favorite is a quote from Lily Tomlin, "No matter how cynical you get, it's impossible to keep up." Just Joking lists for $79 and it's available now. WordStar, 800/227-5609.—T.M.

WE'LL GIVE YOU THE WORLD AND $50 BACK

$50 REBATE*

On most PSI fax/data modems through March 31, 1993. Purchase your PSI fax/data modem from your participating reseller, attach this coupon with proof of purchase and your name, company, address, phone and fax and send it to: PSI Integration Rebate, 851 E. Hamilton Ave., Suite 200 Campbell, CA 95008. Your Purchase must be made before 3/31/93. Limit one rebate per purchase. Valid for US customers only.

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Just click your mouse. It's really that simple. Then you'll see how a PSI fax/data modem can dramatically increase your productivity. PSI brings you a full range of fax/data modems for the Mac, with the latest standards in data compression and error correction. Choose from PSI's COMstation line of desktop models, including ultra-high speed and networkable modems, or the internally-mounted PowerModem family that puts the power of a fax right in your PowerBook. Keep in touch and keep it simple. Call **1-800-622-1722.**

Desktop Products	PowerBook Products	Data	Fax	SRP
COMstation ONE	PowerModem	2400	9600	$195
COMstation TWO	PowerModem II	2400	9600	$295
COMstation THREE	—	14.4	N/A	$445
COMstation FOUR	PowerModem III	9600	9600	$445/$395
COMstation FIVE	PowerModem IV	14.4	14.4	$545/$495
COMstation Network	—	2400	9600	$395

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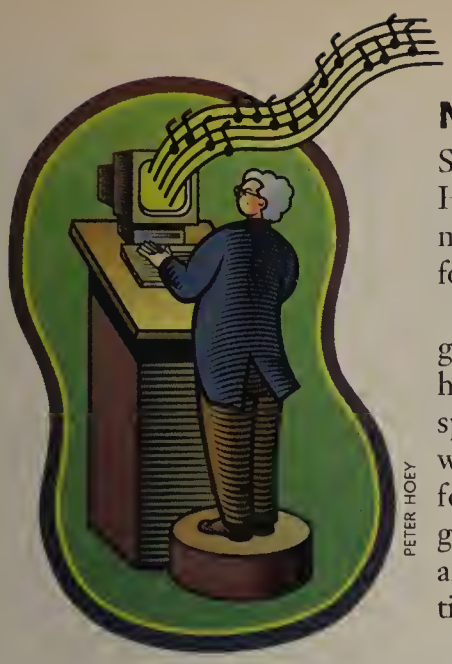


PETER HOEY

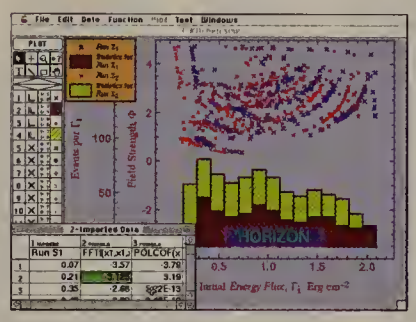
New Horizon

Star Blue Software is shipping Horizon, a graphing and numerical-analysis package geared for the sciences.

Horizon is strictly 2-D and generates only scatterplots and histograms. It provides a spreadsheet interface and a wide range of numerical tools for manipulating data before graphing it, including integral and differential calculus functions, Fourier transforms, data interpolation, and data fitting (including nonlinear least-squares fitting and polynomial fitting). Horizon supports modifying tick marks and other display elements and provides controls over their placement. The program has tools for annotating graphs and preparing them for publication.

Horizon can read data in almost any format, including the fixed-length fields common on mainframe systems. It also can be trained to read data in unusual formats.

Horizon is $430. Star Blue Software, 203/498-6043.—D.L.



STAR BLUE'S HORIZON. NOTE THAT A SCATTERPLOT AND HISTOGRAM ARE COMBINED IN ONE GRAPH.

News

Opcode's Notation Software

MOST MUSIC IS STILL notated by hand. But is this last bastion of commercial fountain pen use about to fall? Opcode Systems—maker of MIDI equipment and software—hopes so. The company will soon release Overture, a music-notation program.

Overture was designed in consultation with composers and arrangers who use Opcode's MIDI products, and it can be used for anything from simple lead sheets to complex scores. It provides five methods for entering music, including real-time MIDI, clicking the mouse, and keyboard entry. The interface is designed for ease of use and relies on a tool bar for performing most actions.

Included software will enable Overture to integrate easily with Opcode's MIDI products, and Opcode says the integration software will work with other common MIDI systems as well. Overture will list for $495. Opcode, 415/856-3333.—RICHARD FENNO

Bigger, Better Bernoullis

IOMEGA CORPORATION has raised the stakes on storage capacity in the removable-media drive market with the introduction of the MultiDisk 150 line, three new Bernoulli drives that accept Bernoulli disks with capacities up to 150MB—much more generous removable storage than the SyQuest cartridge sizes that are currently available. The new 150MB drives also read and write to three new sizes (105MB, 65MB, or 35MB), as well as the more familiar 90MB Bernoulli disks; the drives can read, but not write to, the older 44MB cartridges.

The $1099 MacInsider MultiDisk 150 is an internal drive for the Quadra 900 and 950. The $1225 Transportable MultiDisk 150 is an external unit. The Dual MultiDisk 150, an external system with two 150MB drives, lists for $2499. You'll also need an interface kit, with cables and software, which comes in two flavors—$49 list with Central Point Software's MacTools, a hard drive utility collection that includes a backup program; or $199 with Dantz Development's Retrospect backup software instead. Single disks range from $79 (35MB) to $245 (150MB); three- and five-disk packs are also available. Iomega, 800/777-6179.—TOM NEGRINO

PAUL BERG

VARIOUS CONFIGURATIONS OF THE MULTIDISK 150 LINE OF 150MB REMOVABLE-CARTRIDGE DRIVES.

TREND

Internal PowerBook Modem Prices Plunge

Following the introduction of Apple's aggressively priced $319 Express Modem for the PowerBook 160, 180, and Duos, Global Village Communication and PSI Integration have sharply reduced prices on their internal PowerBook modems, and other manufacturers have entered the market. For example, the price of the Global Village PowerPort/Gold, a V.32bis fax modem that transmits and receives at 14,400 bps, has dropped to $499 from $649. Spokespersons for Global Village and PSI say that their modems work faster than the Apple modem because the Express Modem relies on software for tasks such as error correction and data compression, placing a burden directly on the PowerBook CPU. Instead, third-party modem hardware manufacturers let the hardware itself do those jobs.

New to the PowerBook modem market is APS, known primarily as a mail-order supplier of storage products, which has introduced three models; and Focus Enhancements, which has released 2400 and 14,400-bps modems. Eschewing the slow end of the fax modem market, Supra has announced the SupraFax-Modem 144PB ($349.95) and 144PB Plus ($449.95), both V.32bis modems that transmit data and fax at speeds up to 14,400 bps. The 144PB Plus adds Caller ID and the MNP 10 error-correction protocol, designed for cellular modem transmissions, although Supra did not announce an interface to a cellular phone. APS, 415/390-8200; Focus Enhancements, 617/938-8088; Global Village Communication, 415/390-8200; PSI Integration, 408/559-8544; Supra Corporation, 503/967-2400.—TOM NEGRINO

PRICES DROP FOR POWERBOOK MODEMS

Manufacturer	2400-bps Data/9600-bps Fax	9600-bps Data/9600-bps Fax	14,400-bps Data/9600-bps Fax	14,400-bps Data/14,400-bps Fax
APS	$129.00	$279.00	NA	$349.00
Focus Enhancements	$139.95	NA	NA	$339.99
Global Village Communication	$229.00	$429.00	$499.00	NA
PSI Integration	$195.00	$395.00	NA	$495.00
Supra Corporation	NA	NA	NA	$349.95

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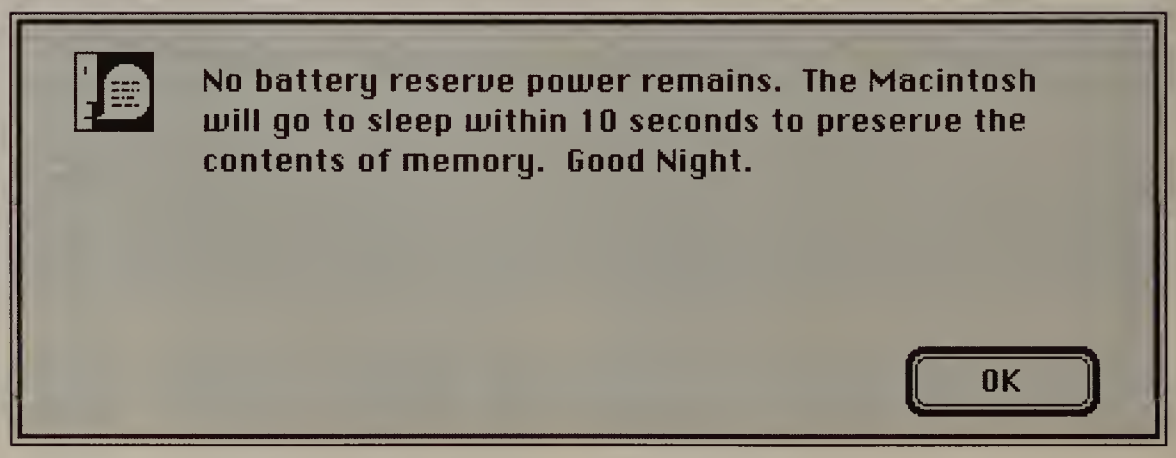

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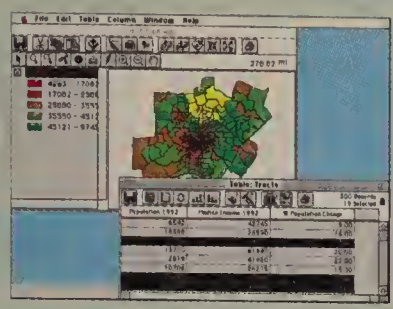
TREND

Maps for the Masses



INNER CITY AND SUBURBS IN STARK RELIEF: ATLANTA IN ARCVIEW II, SHOWING CENSUS TRACTS BY MEDIAN INCOME.

Environmental Systems Research Institute (ESRI) president Jack Dangermond often calls on government to give the public access to information—everything from where banks grant mortgages in city neighborhoods to how emergency agencies plan to respond to toxic spills. Dangermond argues that government should provide this information in map form to help the public visualize and understand it.

ESRI publishes Arc/Info, a sophisticated mapping and geographical-analysis system used by many local, state, and federal agencies to analyze information and generate maps. ESRI also publishes ArcView, an easy-to-use program for creating maps from Arc/Info data.

ESRI announced but never shipped ArcView for the Mac; the company claims its new ArcView II will ship on the Mac. ArcView II is more than an Arc/Info viewer: it can display data from outside Arc/Info; can layer and register raster data, such as aerial photos, with vector data, such as road maps; provides math and statistical functions in its query tool; can chart data as well as map it; can import and export most common formats; and can be driven by Apple events. ArcView II will list for about $500. ESRI, 714/793-2853.—D.L.

Hayes Releases Mini Fax Modem

HAYES MICROCOMPUTER Products has introduced a pocket-size external fax modem that sends and receives faxes and data transmissions at 14,400 bps. The 8.5-ounce Optima 144 + Fax144 Pocket Edition supports the CCITT V.32bis modem standard, the CCITT V.42bis data-compression standard, and the Group III fax standard. The modem comes with RS-232 and telephone cables, a battery pack, a 9.5-volt wall transformer, and a carrying case. Priced at $599, the Optima 144 + Fax144 Pocket Edition is competitive with other small modems, including Telebit's QBlazer Transportable V.32 modem, also priced at $599. Hayes, 404/441-1617.

—JONATHAN CASSELL

JENNIFER CHEUNG

THE HAYES OPTIMA 144+FAX144 POCKET EDITION IS A PORTABLE 14,400-BPS FAX MODEM.

News

DCA's Mainframe Connection

Digital Communications Associates (DCA) has released enhanced versions of its Macintosh-to-mainframe communications software packages, adding support for A/UX and Novell NetWare for SAA (Systems Application Architecture). IRMA Workstation for Macintosh 3.0, DCA's IBM 3270 terminal-communication application, allows users to access mainframe files and applications through the Macintosh desktop. IRMALAN Client for Macintosh 3.0 gives users the same interface to mainframe resources but connects using DCA's IRMALAN/EP 3270 extended-platform gateway. The applications also support other protocols including NetWare for SAA, control-unit terminal, distributed-function terminal, 802.2 token-ring, and synchronous data-link control. DCA, 404/442-4095 or 800/348-3221.—JONATHAN CASSELL

Remote Access for Macs

TELEBIT'S NETBLAZER IS a combination network router and remote-access server. The version 2.0 software adds AppleTalk, ARA (AppleTalk Remote Access), and IPX (Internet Packet Exchange, the Novell network protocol) support to its Internet Protocol support. The NetBlazer can connect over normal telephone lines, ISDN or switched 56, and high-speed leased lines. It requires Telebit's modems because it performs some fancy tricks—using V.42 compression under ARA (which normally disables V.42 compression), running multiple protocols through a single physical connection, combining lines to connect high-speed networks. The NetBlazer can be managed with the standard Simple Network Management Protocol.

The $2399 NetBlazer ST supports up to 18 ARA connections, and the $4599 NetBlazer 40 supports up to 26 ARA connections. Telebit, 408/734-4333.—D.L.

Talking to Big Iron

OpenConnect Systems gives a new twist to Mac terminal-emulation products with seven TCP/IP terminal, connection, and file-transfer tools that work with the Apple Communications Toolbox built into System 7. The suite of seven includes IBM 3270 and 5250 terminal-emulation, SNA-connection, file-transfer, and file-sharing programs. Of special interest, the 5PM application provides IBM host applications with a graphical interface; it's HyperTalk-compatible for ease in scripting. Priced separately, the programs range from $95 to $370. OpenConnect Systems, 214/484-5200.—TOM NEGRINO

TELEBIT NETBLAZER 40 (LEFT) AND KID BROTHER ST, FOR TYING TOGETHER GEOGRAPHICALLY DISPERSED COMPANIES.

BUG REPORT

System 7.1 and Suitcase II The font and DA extender doesn't work with the new System (see "Mac IIvx and System 7.1," in "Turkey Shoot"). Fifth Generation Systems is shipping version 2.1.2 free to registered users on request.

Canvas 3.03 Crashes when attempting to import AutoCAD files in DXF and IGES format. Rotated text disappears when printed. Running with background printing on often causes PostScript errors. Dimensioning is inaccurate in files exported to Illustrator format. Deneba says these problems are fixed in current version 3.05, available free to registered users on request.

System 7.0X and System 7.1 Laser printer drivers for the two systems are incompatible, so printers fail when switching between documents sent by 7.0 and 7.1 users unless the printer is first reinitialized.

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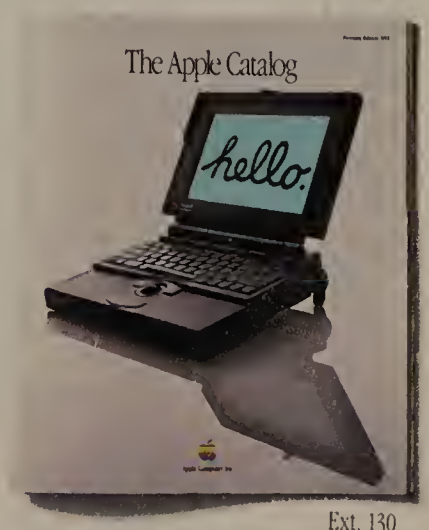

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Top 10 CD ROMs

BY JAMES A. MARTIN

Like many people, I've been waiting oh so patiently for CD ROM technology to grow up—indeed, it feels like CD ROM has had the longest recorded childhood in history, Shirley Temple notwithstanding. Each year since about 1986, optimists have predicted that the fledgling compact disc, read-only memory market was on the verge of maturation, that there would soon be the kind of exciting—and useful—software titles needed to inspire the masses to buy CD ROM drives. But every year, the optimists have been, well, overly optimistic.

Dare I suggest, then, that CD ROM has finally toddled beyond childhood and is now taking big steps toward adulthood? The answer, I'm happy to report, is an unqualified yes, as the winners of *Macworld*'s first Top 10 CD ROM awards clearly demonstrate.

No longer need we be content with CD ROM titles whose biggest allure is that they combine several volumes of HyperCard-linked text on one disc and enable you to search the information in various ways. The current generation of CD ROM releases goes much further, bringing a wealth of information to your Macintosh in the form of video, animation, audio, graphics, and text.

More than anything, QuickTime—Apple's system extension that enables you to play video on the Mac without any special hardware—has injected some much-needed excitement

THESE EXCITING DISCS PROVE CD ROM HAS COME OF AGE

into CD ROM. Because QuickTime movies require a large amount of storage space, a CD ROM platter—with its capacity to house over 600MB of data—has become the ideal home for large video files.

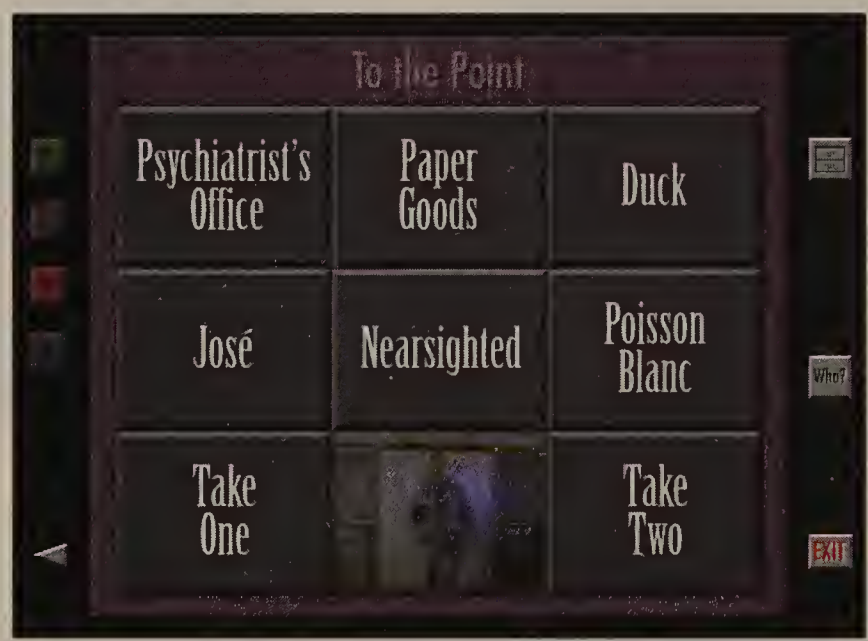
It takes more than QuickTime, of course, to make a CD ROM worthy of your time and money—and a *Macworld* award. From the current crop of titles for the Macintosh, I have subjectively chosen the ten best—those that artfully (not gratuitously) employ video, animation, audio, and graphics; offer a helpful and easily maneuvered interface; and combine solid, meaningful content with interesting or entertaining subject matter, something that would drive you to pop in the CD ROM more than once or twice. In short, any CD ROM that excites the intellect, stirs the imagination, and offers information in a way that only a CD ROM can was eligible for the *Macworld* Top 10.

I didn't look at discs that simply offer what you can get elsewhere—clip art, stock photography, stock video or animation, fonts, application programs, shareware, and the like; in these cases, a CD ROM is simply a convenient way to store large amounts of data. Nor did I consider games or those "interactive movies" that really are games—*Macworld* columnist Steven Levy chooses the best of games every year for our "Game Hall of Fame" awards (see *Macworld*, December 1992).

I did look at as many promising discs as I could get my hands on, and my choices came from among the CD ROMs available commercially as of mid-November 1992. By the time you read this, exciting new titles will surely be available. Among those I expect to make a splash are Total Distortion (Electronic Arts; 415/571-7171), which enables you to create your own interactive rock music videos with 3-D graphics; Dinosaurs (Media Design Interactive, contact Educorp; 619/536-9999), a multimedia reference to prehistoric beasts; and Seven Days (Warner New Media; 818/955-9999), a look at the 1961 building of the Berlin Wall.

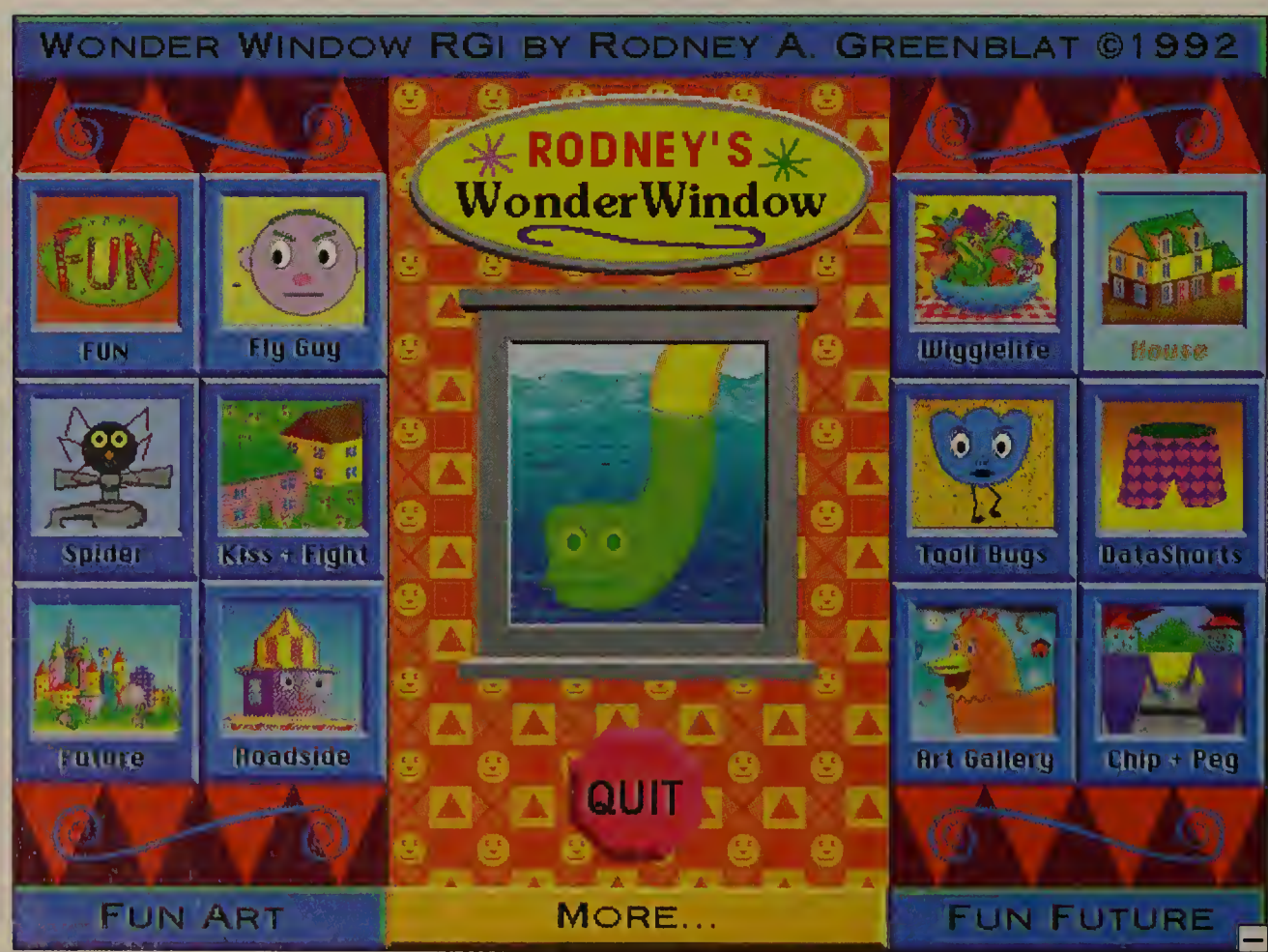
One final aside. For best results, these CD ROMs (unless otherwise noted) require a minimum configuration of a Macintosh LC with 4MB of RAM, a 12-inch color monitor, 8-bit color, and System 6.0.7.

But enough chitchat. Let's get on with it—the ten best CD ROMs for the Macintosh. Finally it's time to pop open the champagne, to put away the pacifier and the perambulator; you can't call CD ROMs kid stuff anymore.



Take My Wife . . . Please Comic Henny Youngman pops up in a QuickTime window in Funny: The Movie in QuickTime to tell yet another joke about his wife.

Crazy Quilt The main interface to Rodney's Wonder Window is a collection of images, as in a gallery; click on any image to launch that sequence.



ENTERTAINMENT

BEST CHILDREN'S CD ROM

Rodney's Wonder Window

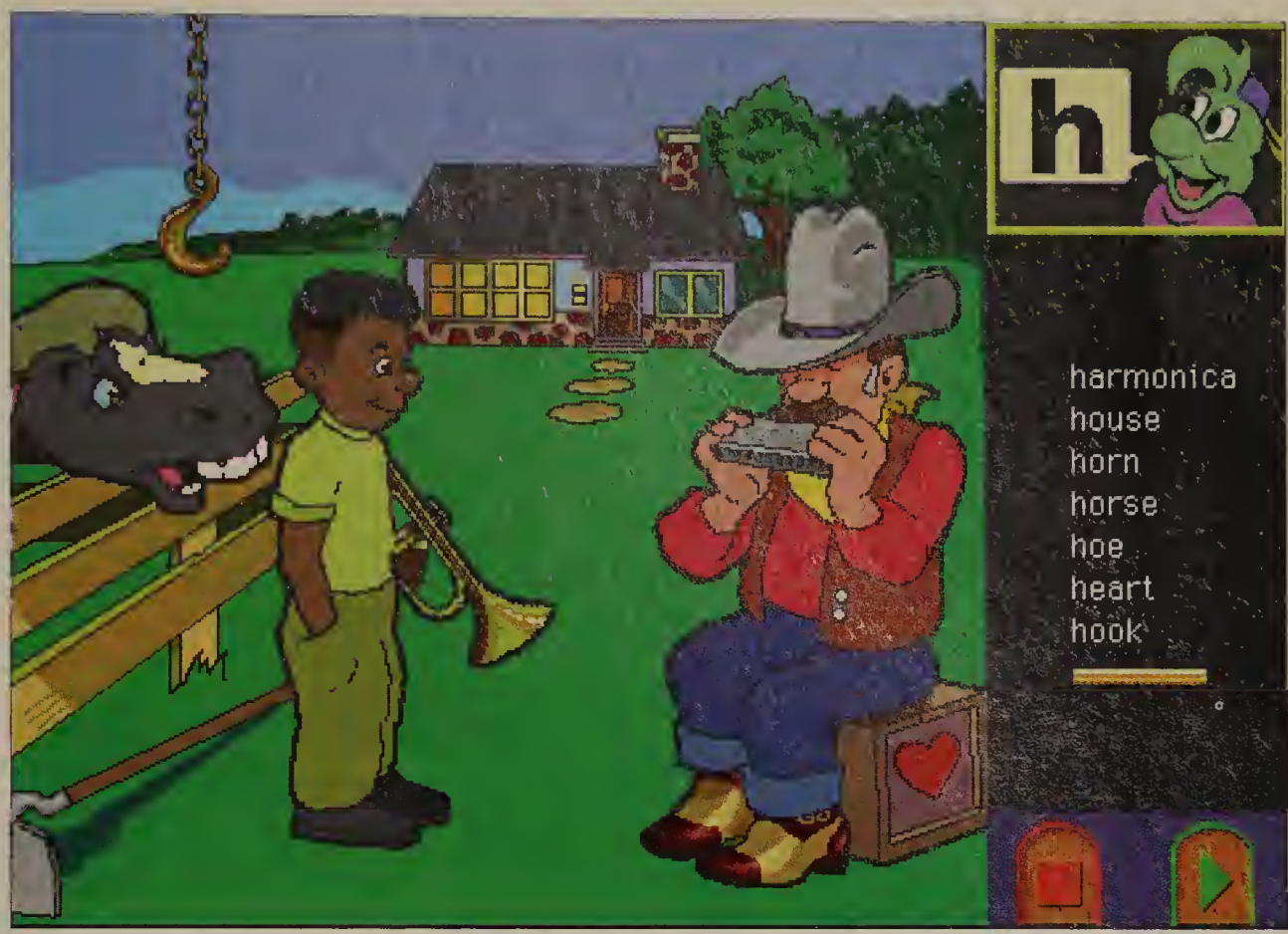
The Voyager Company; 310/451-1383. $39.95.

I use the term *children's entertainment* loosely here, for Rodney's Wonder Window is difficult to classify and isn't really recommended for young children. Imagine a kind of point-and-click "Pee-wee's Playhouse" and you'll have some idea what this disc is about. This disc isn't for all tastes—you'll either enjoy its offbeat animations, as I did, or you'll take a fairly dim view of the whole thing, as did *Macworld*'s Felicity O'Meara (see *Reviews*, this issue).

Theoretically, Rodney's Wonder Window is an animated graphics entertainment for the kiddies, and it certainly fills that bill. More precisely, Rodney's Wonder Window is a collection of phantasmagoric sequences and screens—some sublime, many outrageous—that will please and perplex adults, too.

Rodney's Wonder Window is the brainchild of artist Rodney A. Greenblat; the graphics, sounds, songs, and animations are based on his computer art exhibits of previous years. The disc's interface, appropriately enough, is a gallery; click on any framed image to activate it. And what images you'll see and interact with: a man whose nostril is an all-consuming black hole; the Probe and Poke Pet Shop, where a pooper-scooper comes in quite handy; a plant that "grows" on screen, but only if "watered" regularly; and the unforgettable tooli bugs, whose peculiar mating habits are dramatized (not recommended viewing for young children).

Don't expect any unifying theme to these animations—there isn't one. And don't search for educational enrichment, either. But if you're looking for an offbeat, slightly bizarre, decidedly original CD ROM experience, Rodney's Wonder Window is the hip, happening place to be.



H Is for Harmonica The challenge with this Word Tales image is to click on all the objects—among them hoe, horse, harmonica, and hat—that begin with the letter *h*.

BEST ADULT CD ROM

Funny: The Movie in QuickTime

Warner New Media; 818/955-9999. $39.99.

Special requirements: A 13-inch, or larger, color monitor; System 7 for use on a Mac LC.

Heard the one about the duck who goes into a pharmacy to buy a ChapStick? The pharmacist asks, "Will this be cash or charge?" and the duck replies, "Just put it on my bill."

That's not the best joke in Funny: The Movie in QuickTime, but it's one of the safest for publication. As its warning states, this CD ROM has "something to offend all thinking, feeling life forms," and if you don't appreciate a good dirty or slightly sick joke, steer clear.

But the rest of us warped individuals will have a blast. The CD ROM contains the full-length 1989 feature film *Funny*, which is a series of bits in which someone tells his or her favorite joke (the jokesters include Dick Cavett, Frank Zappa, a disc jockey, and a couple of bartenders). You can watch the film (in QuickTime format) straight through, but it's far more entertaining to access specific jokes via the disc's numerous categories.

This is the kind of CD ROM that QuickTime was made for. Even the corny Henny Youngman routines come across well. "I said to my wife 'Where do you want to go for our anniversary?,'" Youngman deadpans. "She said 'I want to go somewhere I've never been before.' I said, 'Try the kitchen.'" *Barrrrump.*

EDUCATION

BEST CHILDREN'S CD ROM, AGES 4 TO 7

Word Tales

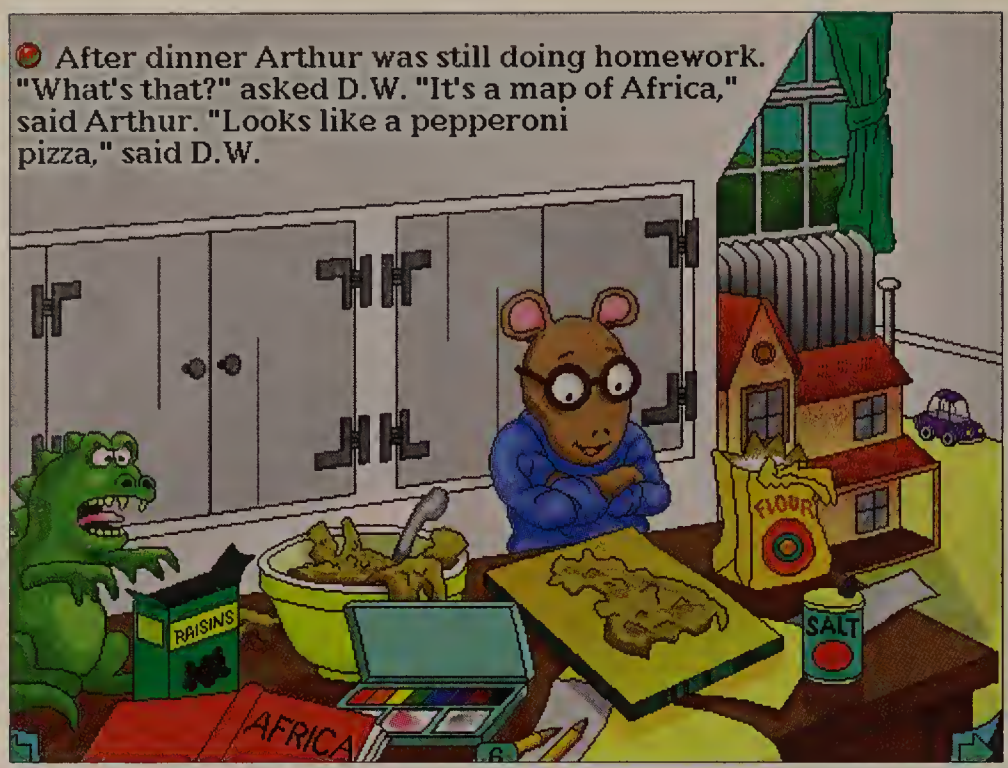
Warner New Media; 818/955-9999. $59.99.

What do you do when you want to give your child a head start learning the alphabet? Call on Milo, a green-faced cherub from outer space with his own high-tech workshop.

Milo is the gregarious host of Word Tales, a vastly entertaining, interactive, animated alphabet tutorial. Milo guides you through the program's drills, offering cheery support along the way, and for every drill you successfully complete, Milo rewards you with an arcade game. (Although Word Tales is available on floppy disks for $49.99, that version has fewer animations and other limitations that the CD ROM doesn't.)

Milo's workshop is complete with six TV monitors, a choochoo train, and what looks like a cross between a boom box and an old Univac computer. Click on any of the five small monitors (Milo presides from the largest one), and you get a full-screen color image of an object—a red wagon, for example. Milo asks you what the first letter of *wagon* is; to the left of the wagon are three letters in big blocks, from which to choose. Once you pick *w*, the next full-screen image is full of objects, and the challenge is to click on everything that begins with *w* (wizard, waffle, walrus, and so on).

There's no better way to teach a child than to make the lesson fun, and Word Tales, with its colorful, whimsical objects and gently challenging arcade game, accomplishes



Arthur's Art Project Arthur the aardvark, the hero of Arthur's Teacher Trouble, is busy with his homework assignment—to make a map of Africa—while a scaly green friend looks on.

this with ease. And just wait until you get to the X-ray machine!

BEST CHILDREN'S CD ROM, AGES 6 TO 10

Arthur's Teacher Trouble

Brøderbund Software; 415/382-4600. $59.95.

Many grade-school children hate homework, distrust the teacher, are curious about practically everything, and have a bothersome sibling. Arthur's Teacher Trouble, the second in Brøderbund's Living Book series for kids, takes all of this preadolescent angst into account and delivers an interactive experience that's entertaining, educational, inspiring, and gratifying—particularly in the bothersome-sibling department.

On the first day of school, Arthur, a timid, bespectacled aardvark, discovers that his teacher is a homework-happy disciplinarian. Soon Arthur is studying furiously for the annual spellathon—driven by severe teacher trepidation. Meanwhile, he's constantly vexed by his bratty kid sister.

There's plenty of educational value here, and a lot of fun besides. The text of each page is highlighted as it's read aloud (in English or Spanish), and there are three consecutive screens of words that are spelled aloud. The accompanying images perform unpredictable acts whenever they're clicked on.

Practically every page of this electronic "book" is dense with surprises that arouse and satisfy a child's curiosity—and wonderfully show off the advantages of CD ROM. Click on two canisters, and they become French cancan dancers. Click on the teacher's tie, and he tries out an Elvis impersonation. Click, and a basket of fruit launches into a hillbilly jubilee.

Along the way, kids learn the value of homework and discover that the teacher isn't so bad. Best of all, there's the opportunity for some choice revenge: click on the kid sister on one page, and she rolls off the side of a bed; click on her elsewhere, and the chair she's sitting in folds up. These two mouse-clicks alone are worth the price of admission.

REFERENCE

BEST GENERAL REFERENCE CD ROM

The New Grolier Multimedia Encyclopedia

Grolier Electronic Publishing; 203/797-3530. $395.

Early gee-whiz predictions about CD ROM promised that one day we'd have entire encyclopedias on one disc. That day is here, folks, and it was worth waiting for.

At first glance, this CD ROM's price—nearly $400—seems outrageous. But when you consider what you get for the money—all 21 volumes of the *Academic America Encyclopedia*, plus a generous offering of QuickTime movies, animations, and audio clips—it's well worth it, particularly for schools.

You can search Grolier's alphabetically, type in a key phrase, or select an index from the tool bar. Click on the tool bar's movie camera icon, for example, and you get an index of all QuickTime clips, arranged by category. Select a category, and the next screen lists all the movies that apply.

I always find myself picking the Hindenburg Disaster QuickTime movie—even in the tiny video window, the famous footage of the zeppelin's fiery crash and the newsreel announcer's anguished narration ("Oh, the humanity!") never cease to cause goose bumps. Should you want more information on the Hindenburg, click on the Linked Articles button and select from among the related text entries.

Famous catastrophes aside, Grolier's is a well-rounded, useful, and exciting reference work, one you'll want to turn to again and again.

BEST TRAVEL/ GEOGRAPHY CD ROM

Great Cities of the World, Vol. 2

InterOptica Publishing; 415/788-8788. $49.95.

As a travel buff, I was skeptical of InterOptica's Great Cities of the World, Vol. 2; other travel-guide CD ROMs I'd seen were frustratingly skimpy on content. But after a few minutes, it was clear that this was a refreshing exception. (Great Cities Vol. 1 was released in September 1991 for MS-DOS and Microsoft Windows computers; Vol. 1 for the Mac is expected to ship in early 1993.)

Great Cities of the World provides engaging armchair travel (or is that desktop travel?) through the use of text, QuickTime clips, and color graphics. Instead of trying to cover numerous destinations with superficial content, InterOptica cast a narrow net—

only ten cities (Berlin, Buenos Aires, Chicago, Jerusalem, Johannesburg, Rome, San Francisco, Seoul, Singapore, and Toronto) are featured on the disc—but its content runs surprisingly deep.

If you're researching a trip to San Francisco, for example, you can read an evocative, extensive essay on the city's culture by noted writer Diane Johnson; view a slide show of large color photos (with narration); watch the QuickTime clip (which is surprisingly good); and get highly detailed information about restaurants, hotels, shopping, sight-seeing, transportation, and recreation, right down to phone numbers and price ranges. This kind of information becomes outdated all too soon, of course, but it's wonderful to have anyway.

Another InterOptica title worth a look is *Great Wonders of the World, Vol. 1—Man-Made* ($79.95). The disc offers multimedia tours of the Great Wall of China, the city of Venice, the Empire State Building, and other man-made marvels. It's not as useful as *Great Cities*, but it's extremely entertaining.

BEST MUSIC CD ROM

The Orchestra

Warner New Media; 818/955-9999 $79.98.

Special requirements: Stereo headphones or speakers.

There are certainly more-glamorous, exciting discs on the market, but The Orchestra, a guide to the inner workings of an orchestra, provides the kind of fascinating, fulfilling journey into its topic that is the essence of a good CD ROM.

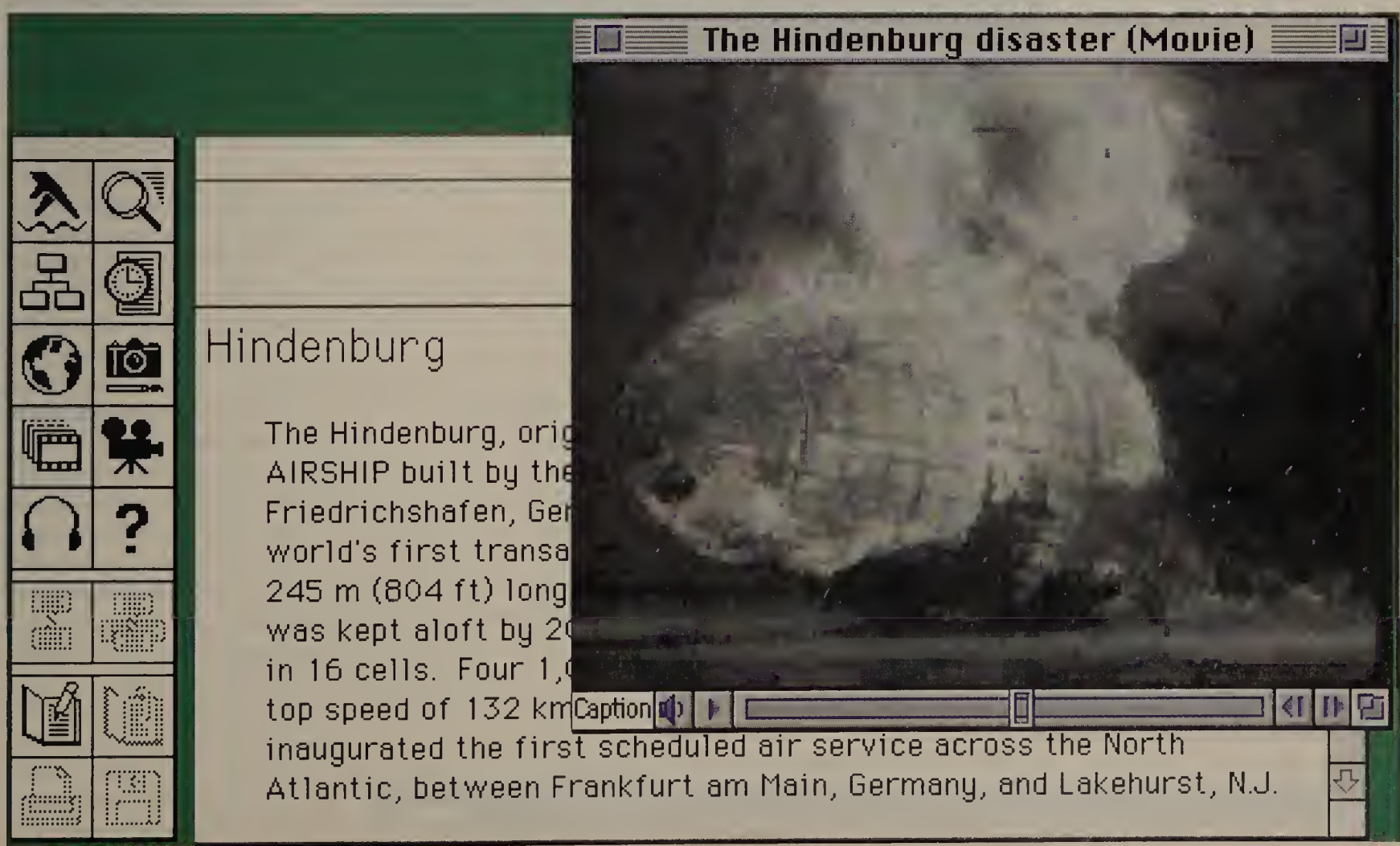
Using HyperCard stacks, you can learn about how classical music is written, played, and conducted. The disc includes some 500 audio clips—everything from an ambulance's siren to Zwilich's Symphony No. 1, as well as Benjamin Britten's musical piece, *A Young Person's Guide to the Orchestra*. You can flip through all the audio clips in alphabetical order or by composer, or access them via icons throughout the program.

There are detailed diagrams of musical instruments (did you know that part of the violin bow is called the frog?), essays that combine text and audio (click on the musical note icons in one window, for example, to hear the same notes played at different tempos), even a few test-your-knowledge games. In Name That Instrument, for example, you have to listen to the sound being played, then correctly name the instrument that generated it—and you have five seconds. The program keeps a scorecard based on your answers, and every wrong answer costs you.

And if that's not enough interaction for you, you can

Windows on the World By clicking on any of these 12 icons in Great Cities of the World, Vol. 2 (top), you can get a different perspective of Buenos Aires; here, a QuickTime movie of the Argentine capital runs in the middle of the screen.

Catastrophe in QuickTime The New Grolier Multimedia Encyclopedia includes a variety of QuickTime movie clips, including the famous footage of the 1937 Hindenburg explosion (bottom).



conduct a session of "Greensleeves" yourself, picking any two instruments at a time to play the tune (I chose the harp and the tuba—not a good idea, and the program told me so in no uncertain terms).

The Orchestra's $80 price tag may seem a bit high, but a classical music education ain't cheap, you know.

BEST LITERATURE CD ROM

Poetry in Motion

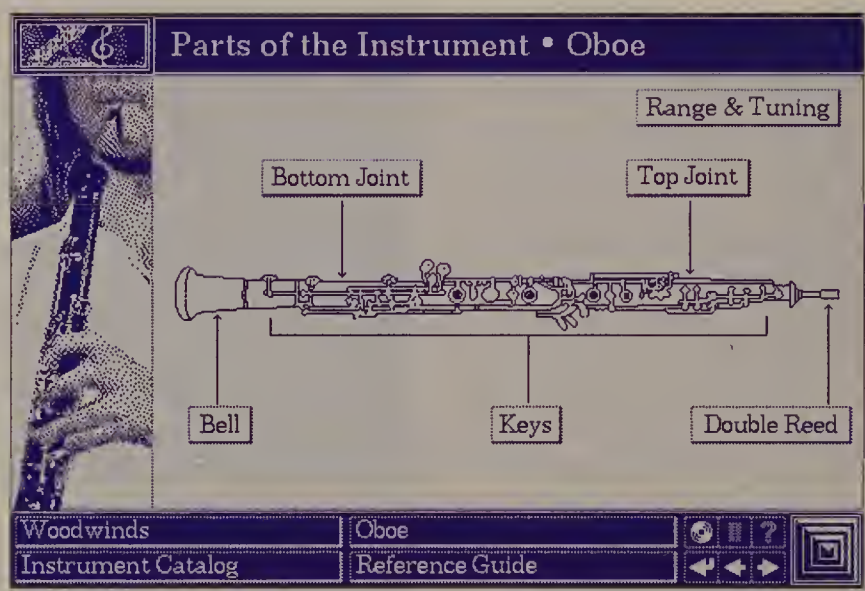
The Voyager Company; 310/451-1383. $29.95.

Voyager's Poetry in Motion, a QuickTime collection of poetry readings, easily takes the prize in this category. But—gasp—poetry readings? In QuickTime? It does sound rather tedious, I must admit; but when you have on hand such vital, uninhibited, seasoned talent as Charles Bukowski, Allen Ginsberg, William S. Burroughs, John Cage, Tom Waits, and Ntozake Shange, the sparks fly.

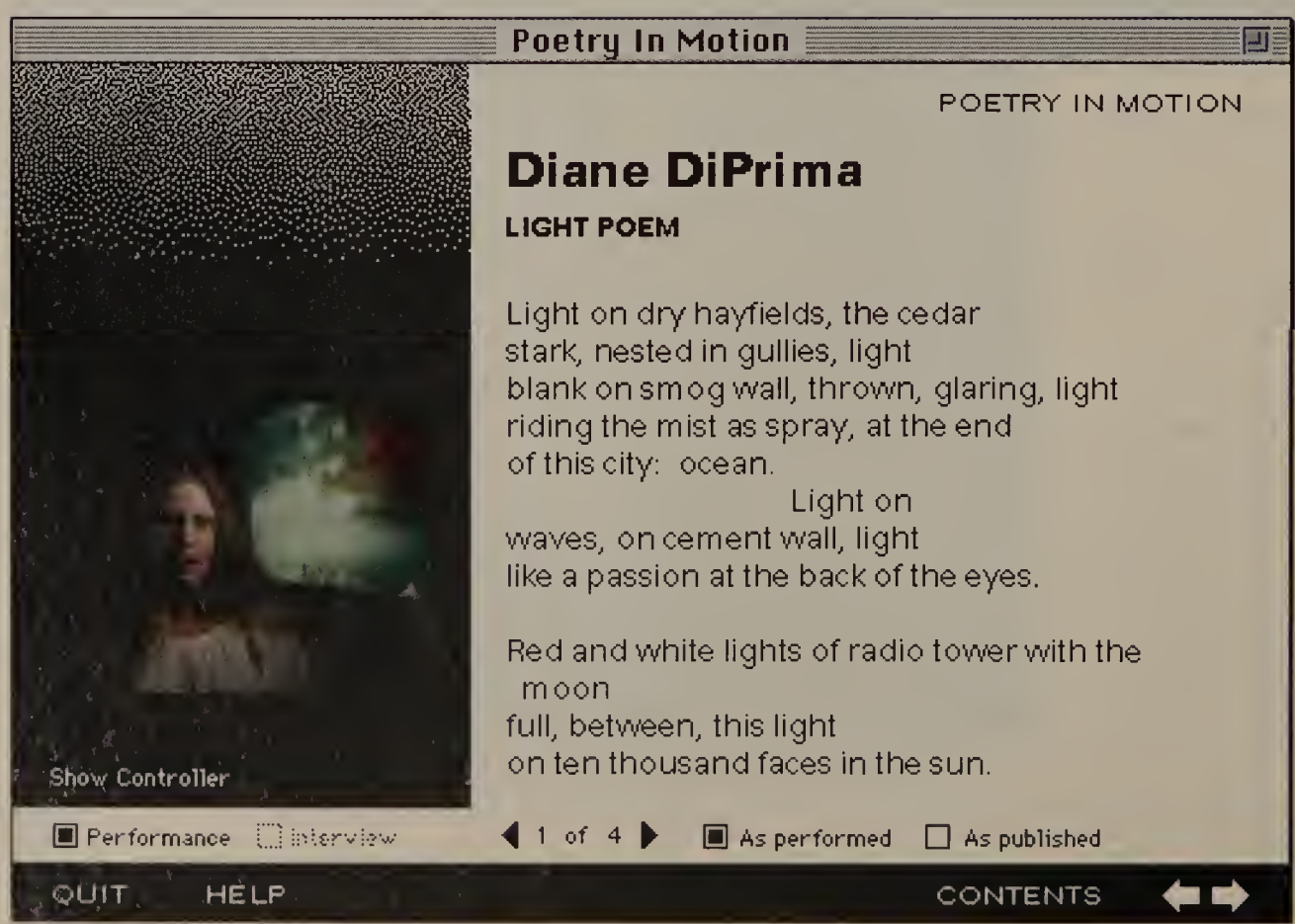
The source for this disc is Ron Mann's documentary film *Poetry in Motion*, which shows a selection of top modern poets reading their work; his goal was to develop a kind of K-tel record anthology of poets.

The disc's table of contents lists the poets included; click on a name and you get a QuickTime window of the poet reading. Underneath that window is frequently, but not always, another QuickTime window, in which the poet is interviewed. To the right is the text of the poem. Interestingly enough, you can choose to read the text as it was originally published or as it is performed here—and there are more differences between the two than you might suppose. (For more about this disc, see *Reviews*, February 1993.)

I enjoyed Poetry in Motion because it brings a kind of contemporary performance art to the computer, and it reinvents the ancient, and supposedly dying, form of oral literature. When comparing reading poetry to hearing it read by the author, the cantankerous, boozy Bukowski sums it up best: "Reading the poets has been the dullest of things. . . . All I get is a goddamn headache and boredom." No worries about that here.



All about the Orchestra With The Orchestra, you can explore the world of musical instruments through detailed diagrams and other graphics, audio clips, and text.



Sheer Poetry In Poetry in Motion, QuickTime movies let you see and hear contemporary poets read their work; the text of the poem is shown on the right. In many cases, a filmed interview accompanies the reading.

BEST INTERACTIVE BOOK CD ROM

From Alice to Ocean

Addison-Wesley Publishing Company/Against All Odds Productions; 800/879-4086. $49.95.

In all honesty, there's been so much written about this glossy coffee-table book–CD ROM combination—said to be the first such cross-pollination publishing venture—that I came to it with some prejudices. Who cares, I thought, about Robyn Davidson, this pretentious 27-year-old woman who crossed the treacherous Australian outback on her own (trailed by photographer Rick Smolan), took two years to plan the trip, and developed an "anthropomorphizing devotion" to her camels? Oh *please*—if she had any sense, she'd check into a nice hotel in Sydney and order room service instead.

But she didn't, and after spending some time with Davidson's story, I'm glad she didn't. (I, on the other hand, would have gone for the room

service like *that*.) Slowly, the story of her journey begins to enthrall; and it's a treat to watch the story unfold on your computer with full-screen, high-resolution images, accompanied by Davidson's narration, which really bring the book to life. The disc lets you watch the journey in a linear fashion or jump in by choosing any of six segments.

The companion book, photographed by Smolan (of the *Day in the Life* book series), is gorgeously illustrated and produced, and Davidson's text is hard-edged, lean, and redolent.

But do you really need a book and a CD ROM on the same subject? Well, no; but that's like asking if room service is truly necessary, and I presume you know the answer to *that* question.

From Book to CD ROM From Alice to Ocean lets you enter into the story by clicking on locations on a map of Australia. For each portion of the journey, you can view photos, listen to narrative from photographer Rick Smolan and author Robyn Davidson (shown here with friend), get photo tips from Smolan, and read related sidebar material.

BEST AUTOBIOGRAPHICAL CD ROM

I Photograph to Remember

The Voyager Company; 310/451-1383. $39.95.

Special requirements: Color monitor not needed, but 8-bit gray-scale video is required. Stereo headphones or speakers required.

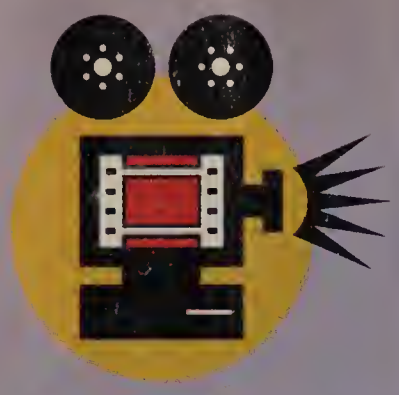
This is the black sheep in this Top 10 family. There are no QuickTime clips, no dazzling animations, no clever interactive windows or other special effects, and its photographs are all black-and-white. So why does this one rate among the Top 10? Simple: It's the only CD ROM to cross my path that captures, with supreme eloquence, the stuff of everyday life and death—the only disc that's capable of arousing the viewer's deepest emotions.

I Photograph to Remember is a collection of images by Pedro Meyer, a leading Latin American photographer. Meyer has focused his lens, and his narrative, on the last three years of his parents' lives, when first his father, and then his mother, were diagnosed with cancer. Remarkably, Meyer photographed them constantly throughout this period. "Taking these pictures," he explains on the audio track, "was the only way I could someday understand what was happening around me," as the emotions he experienced at the time were too blinding.

Family Portrait Pedro Meyer's autobiographical CD ROM essay, I Photograph to Remember, focuses on the last three years of his parents' lives.

Meyer's narration is accompanied by Manuel Rocha's sparse, but haunting, musical score, and the photographs—while sometimes painful to look at—beautifully capture his parents' inner strength, grace, and affection for each other during their ordeal. This is powerful stuff, and its intimate, autobiographical tone seems perfect for viewing on a computer.

I Photograph to Remember is a long way in spirit and style from the likes of Funny, Word Tales, and practically everything else on CD ROM, and that's one reason why I treasure it. It represents what I think is the true promise of CD ROM—that as this technology continues to mature, there will be room for all kinds of voices, expressed in a variety of styles, in ways that simply couldn't be as effectively conveyed using any other medium. When you think about it, what could be more exciting than that? m



BY JOSEPH SCHORR

First-Time Authoring

JUMP INTO MULTIMEDIA

Multimedia—that seductive melding of sound, graphics, animation, and movies on the Macintosh screen—has long been the exclusive domain of high-end users. After all, full-featured multimedia authoring programs like Macromedia's MacroMind Director ($995 list) or Authorware Professional ($4995 list) can put quite a dent in your media-production budget. Furthermore, creating professional-looking interactive presentations with such software is a time-consuming process that often involves learning a scripting language and, in some cases, editing hundreds of frames of animation. Obviously, such programs are not for everyone.

If the demands of frame-by-frame animation and the discipline of mastering an interactive scripting language seem overwhelming but you still want to jazz up your screen presentations with motion and sound, here is some good news: several new products are specifically designed to make multimedia production available to mainstream Macintosh users. Thanks to these new programs, non-Quadra-owning

GORDON STUDER

PRODUCTION WITH ONE OF THESE FOUR PROGRAMS

folks on a shoestring budget who have only limited time can finally experience multimedia for themselves. Let's look at four new programs aimed at novice multimedia producers: Macromedia's Action, Passport Designs' Passport Producer, Interactive Solutions' MovieWorks, and Interactive Media Corporation's Special Delivery.

There are plenty of reasons to venture into the world of multimedia, not the least of which is that producing MTV-style video and music presentations on your Mac is just plain fun. In a more practical vein, combining motion and sound can spark up educational and business presentations and add excitement to otherwise routine slide shows. Let's face it, moving charts, flying logos, and a musical score can make the difference between a run-of-the-mill presentation and one that an audience enjoys—and remembers.

Once you've created a sizzling on-screen production, you have several options for presenting it. You might want to run a slide show, complete with multimedia elements, from a Mac as you narrate a presentation, displaying the images on a large screen with a projection system. Or you might create an interactive presentation, where the viewer presses buttons to view different slides or movies. Depending on the program you've used to create it, you can save the final product as a

QuickTime movie or print it to videotape using an RGB-to-NTSC video converter. Two of the packages reviewed include a playback version of the program so that a finished presentation can be distributed on disk and run by someone who doesn't own the original application.

What You Need

MOST OF THESE PROGRAMS target entry-level multimedia users, though the term *entry level* is a bit misleading in this context. Even at its most basic, multimedia involves more-than-basic equipment.

Processing the flow of digitized sound, color graphics, and QuickTime movies that make up a typical multimedia presentation is a hefty task. At the very least, you need a 68020-based CPU, such as the Macintosh LC. If you intend to turn out a presentation with multiple sound tracks, numerous QuickTime movies, or 24-bit color graphics, don't use less than a IIci. (Despite the minimum configurations listed on their boxes, most companies recommend a IIci with 8MB of RAM.) You can run any of the applications discussed here on an LC or LC II with 4MB of RAM, but if you do, be prepared to sacrifice the velvety smooth transitions, fluid animations, and seamless integration of sound that make multimedia so appealing. In general, if you start combining sounds, pictures, and transitional effects on slower Macs, the results will be halting, jerky, and decidedly uncinematic.

As for the multimedia packages themselves, even the least expensive of these products lists at nearly $400; that's $600 *less* than Director but still a significant software investment for those just looking to get their feet wet.

And speaking of software, remember: each of the multimedia programs described in this article is designed to mix a variety of media—QuickTime movies, PICT images, digitized sounds, and so on. This assumes you already have the software you need to create and edit the pictures, movies, and sounds you will use—or, if not, that you have a generous supply of clip art at your disposal. (The exception is MovieWorks, which comes with a group of companion applications that let you produce your own sounds, pictures, and text.) Without good source material, your multimedia options are greatly limited. (If you're interested in more than clip art, consider purchasing some clip media to use in your projects. Sources for sound, animation, and QuickTime movie files are listed in "Media to Go.")

How It Works

EACH OF THESE PACKAGES takes a somewhat different approach to assembling a multimedia presentation, but the basic concept behind all of them is the same: you create a series of backdrops and then use an import command to place objects of various media types against those backdrops.

The contents of your presentation can be drawn from a wide variety of file types—QuickTime movies, sound files, text files, PICS animations, and graphics (all four of the programs support PICT-format graphics; Special Delivery supports TIFF and EPS as well). All of the programs allow you to control not only which objects are on the screen at any given time, but also the manner in which they appear and vanish (or are heard, if they're sounds) and how they're positioned in relation to each other.

In all of the programs discussed here, with the exception of Passport Producer, you can transform certain objects into buttons, creating a link to other objects or other scenes in a presentation. During playback, your monitor becomes a full-screen "slide projector" and you can click on the buttons you have created to play movies or transport the viewer to another scene in the presentation.

Another common denominator among the applications reviewed is that they're all quite new and subsequently suffer from a host of version 1.0 ailments. In some cases, newer versions are already shipping and bugs are being ironed out. That said, here's an overview of the four entry-level multimedia programs available at press time.

Action

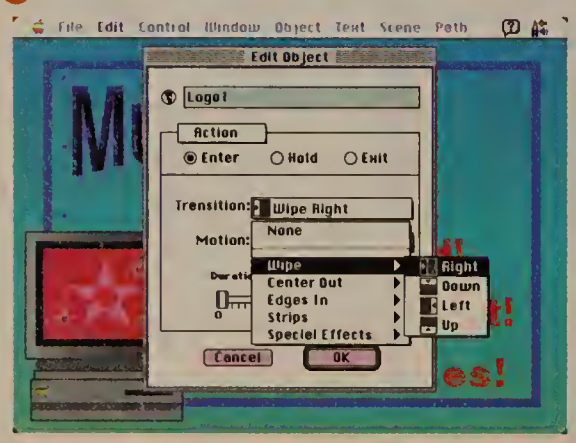
MACROMEDIA'S ACTION IS PRIMARILY designed for those who have used slide-presentation software and now want to add multimedia elements to their presentations. The program's overall approach to assembling a presentation is somewhat akin to creating a static text-and-graphics slide show, but with the added elements of time and motion.

USING ACTION

1 Import graphics, sound, animation, or QuickTime movie files and position them on the Stage to build a scene. Then use the Edit Object dialog box to configure the action, duration, and transitional effects connected with each object. In this example, a left-to-right wipe effect is being applied to a PICT graphic.

2 Examine the scene in the Timeline window to see the time-based relationships between all the objects in a scene. Eight separate objects make up this scene: a sound file, four text objects created with Action's text tool, two PICT graphics, and a rectangle object created with Action to frame the other elements. The bars can be dragged to change the entrance and exit of each object.

3 After creating a number of scenes, you can rearrange them using the Scene Sorter window. Each slide in the window represents one scene in the presentation; drag the slides to change their sequence in the presentation. Symbols next to each slide show links established between scenes and any transitional effects from scene to scene.

1


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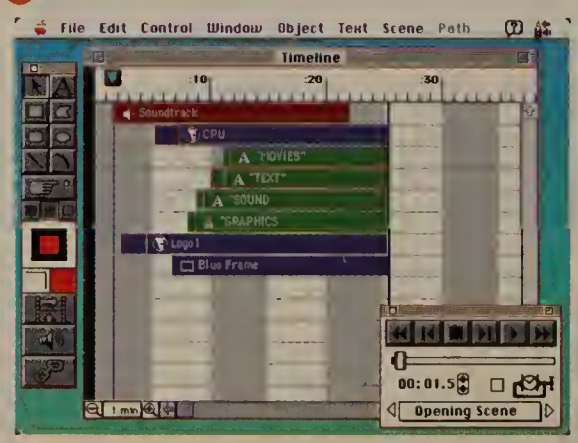

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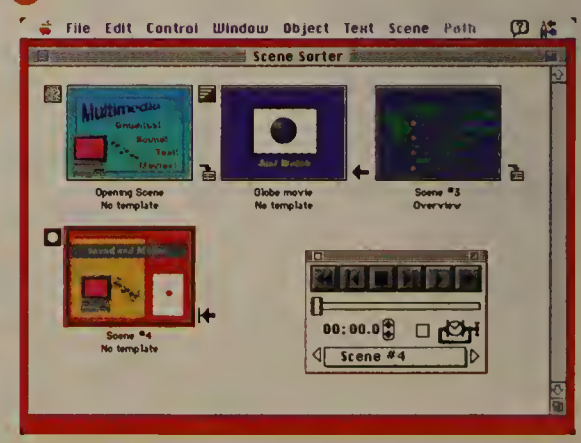


ENTRY-LEVEL MULTIMEDIA SOFTWARE

	Action 1.0	MovieWorks 1.0	Passport Producer 1.0	Special Delivery 1.0
Company	Macromedia	Interactive Solutions	Passport Designs	Interactive Media Corporation
Phone	415/442-0200, 800/288-4797	415/377-0136	415/726-0280, 800/443-3210	415/948-0745
Price	$495	$395	$495	$399
Suggested required RAM	8MB	8MB	8MB	5MB
System 7 required	○	○	●	●
Sound format support	AIFF, SoundEdit	Movie, AIFF, sound (snd) resources	AIFF, Sound Designer II, MIDI	AIFF, AIFC, SFIL, sound (snd) resources
Graphics format support	PICT	PICT	PICT	PICT, EPS, TIFF, PNTG, SCRN
Text tool included	●	●	●	●
PICS animation support	●	●	●	○
Number of transitions	30	14	18	16
Moves objects on path	●	●	○	○
Interactivity via on-screen buttons	●	●	○	●
Creates gradient backgrounds within application	●	●	○	○
Basic drawing tools included	●	●	○	●
Playback application included	●	○	●	○
Templates provided	●	○	●*	●*

● = yes; ○ = no. * Backgrounds only.

In Action your presentation is made up of *scenes* instead of slides. Within each scene, you can add graphic, text, movie, and sound objects—AIFF, SoundEdit, PICT, PICS, or QuickTime files—that can play consecutively or simultaneously. The backdrop for the entire presentation is called a *Stage;* it can be set to display a solid background color, an imported PICT graphic, or a two-color pattern or gradient. Action provides a palette of 63 background patterns and 6 gradient styles. Each scene in a presentation can have a different background.

Once you have imported an object into Action and have placed it on the Stage, you simply double-click on the object to set its attributes. You can select one of 30 different transitional effects for the object's entrance and exit (dissolve, wipe, iris, and so on). If you want the object to move across the Stage, you can set the speed at which the object moves and edit the path on which it travels. Sounds can be linked to specific objects or imported separately to play for the duration of a scene (although only two sounds can play simultaneously). You can navigate the presentation by using the VCR-like Play, Fast

Tips for Successful Presentations

As the author of a multimedia presentation, you must be part graphic artist, part film director, part orchestrator, and part computer wizard. Here are several tips to guide you when you are wearing those diverse hats.

- Plan carefully. Even the best multimedia packages won't serve you well unless you know what you're trying to accomplish. Decide how many scenes, images, sounds, and transitions you need to tell the story, then create a storyboard for your project.
- Prepare your source media thoroughly. Before you start assembling the presentation, use your favorite graphics, audio, and video applications to polish up the sounds and pictures that will become part of it. Passport Producer allows you to launch other programs to edit graphics and sound, but doing so is time-consuming and requires 8MB or more of RAM. Better to start with your source material ready to roll.
- Build presentations that match the processing limits of your computer. If you have a IIsi, don't plan on layering two QuickTime movies against a 24-bit color background—you'll grind your machine to a halt. Better to have fewer transitions that melt fluidly into each other than to have dozens of fancy effects that cause the presentation to stutter and jerk.
- Boost the available memory on your computer. Manufacturers of the programs discussed in this article all recommend that you exceed the suggested system requirements. Programs such as Passport Producer and Macromedia's Action allow you to load QuickTime movies and other files into RAM at the start of a presentation in order to speed up processing—if there's enough memory to spare.
- When using color images in presentations, work at lower bit-depth if you can: the Macintosh can process 8-bit images much faster than 24-bit images during a presentation. Also, be sure to run your presentations at the same bit-depth as the images included in them so that your computer doesn't have to worry about converting graphics files to the proper bit-depth while a presentation is playing.
- Keep your production's movies, sounds, and graphics in a single folder. When you create a presentation, most of these programs simply reference the source files and read them from the original files on disk when a presentation is played. Keeping source files together with the presentation application itself makes it easier for the computer to retrieve that information on cue.
- Resist the urge to use an overabundance of special effects such as transitions and objects flying along a path. Too many effects will not only degrade playback quality but also be distracting. After a while, the venetian-blind effect won't impress your viewers, it will make them dizzy.
- Watch, study, and dissect the sample presentations that come with the programs. You'll see what these program can really do and learn what professionally prepared material looks like on your particular Macintosh.

Forward, and Rewind controls that are on the floating control palette.

To add titles or other text to the screen, Action provides its own text tool, eliminating the need to import text objects. The program also includes basic geometric drawing tools (circle, rectangle, line) that can be used to frame and offset text or other objects.

In Timeline view, the program provides a second-by-second plot of the entire presentation, with bars on the time line representing each object. The entrance, duration, and exit of any object can be edited by dragging on the bars—a particularly easy way to organize the timing elements in a miniproduction without adjusting settings in a succession of dialog boxes.

Action can't play back at full speed while in editing mode; you have to switch to playback mode. This means constantly jumping back and forth between the two modes to check your work—a process that bogs down editing in an otherwise efficient working environment.

If you want to produce sharp-looking presentations that require minimal setup, Action comes with an outstanding selection of ready-to-use templates. The templates include vivid backdrops and an array of built-in transitions and animated effects. All you have to do is plug in your own text. Action owners also get an instructive videotape that teaches the basics of using the program.

Action is flexible and easy to learn, with tools that give you plenty of control over the timing and placement of each element in a presentation. Overall, it's one of the best multimedia packages for beginners.

Passport Producer

WITH PASSPORT PRODUCER, you build presentations on the Cue Sheet, a multicolumn worksheet used to dictate the flow of all presentation elements. In the first column is a time line for referencing your position in the production. The remaining columns on the worksheet are the tracks on which you place *cues* (Producer's term for pointers to the imported elements of a presentation) to mark the entrance, exit, and duration of each sound or image in the presentation. Producer's time line and digital counter are designed to support the highly accurate SMPTE (Society of Motion Picture and Television Engineers) timing standard used in the video and broadcast industries for precision synchronization of video and digital audio.

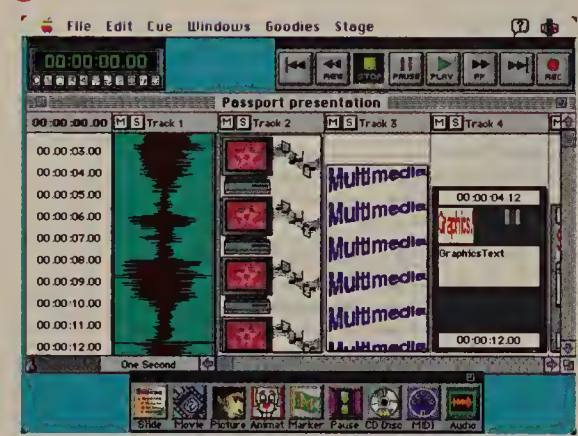
Importing media elements is easy with Producer. The floating Cue Palette contains icons representing each of the various media types you can access. When you drag the appropriate icon from the palette and position it on the Cue Sheet, a dialog box appears listing all the files you can import. In addition to handling the usual PICT, PICS, text, AIFF, and QuickTime formats, Producer can also import Sound Designer II files and MIDI sequences (MIDI, which stands for Musical Instrument Digital Interface, enables the Mac to play music on devices such as synthesizers).

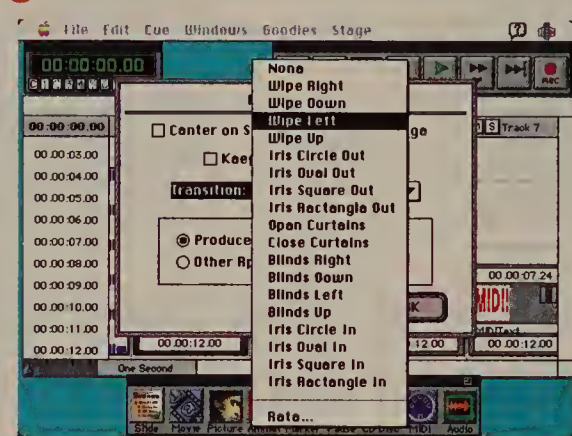
Once positioned on a track on the worksheet, each tilelike cue can be moved and resized to alter the duration of its performance during the presentation. Cues can be assigned transitional special effects, but there are only 18 effects to choose from, compared to Action's 30. Another limitation is that you can't create on-screen paths on which a cue will travel during the presentation. After you position the imported material on the Stage, it remains in a fixed location.

A Transport palette offers Play, Rewind, Fast Forward, and Pause controls that enable you to navigate the presentation. Producer also allows you to set as many as nine markers at designated points for moving quickly to key points in the presentation.

Like all of the programs discussed here, Producer is not designed to create media elements but to unite them in a polished presentation. Nevertheless, it does have built-in editors to handle basic tasks—cutting, copying, and pasting—in graphics, movies, and sound files. There's also a menu command that enables you to launch other applications from within Producer and create or edit sounds, pictures, and the like in those applications.

Producer includes a built-





USING PASSPORT PRODUCER

1 Select the appropriate icon from the Cue Palette (along the bottom of the screen) and drag it into place on the Cue Sheet to add media files (called cues) to the presentation. Drag the cue tiles to the desired point to establish entrances and exits.

2 Use the Cue Set Up command to set up the attributes of each cue you've imported. Here a transitional wipe effect is applied to one of the graphics used in the presentation.

3 Switch to the Stage view to position and layer each of the cues against the selected background.

in slide maker to produce text slides with headings and bulleted paragraphs. The only drawback with this feature—and it's a serious one—is that it does not support Adobe Type Manager. PostScript fonts appear jagged on slides unless you have installed screen fonts in the exact point sizes used in your presentation. The program does support TrueType fonts, which will be rendered properly when scaled to any size.

Slides can be assigned any background color, but you can't use gradients or patterns unless you draw them in another graphics program and import them for use as a backdrop. Alternatively, a PICT file can be pasted in as the background graphic.

Unfortunately, Producer is only marginally interactive. Unlike the other packages described here, it does not offer a tool for creating buttons that viewers can click on to navigate the presentation. There is, however, a pause feature, which permits you to specify points at which a presentation pauses until the mouse is clicked or a key is pressed. This allows for limited interactivity, but not on the level of the other three packages.

Still, Producer is an outstanding platform for mixing media. Its interface is the most graphical of the products described here, and it requires minimal time to master the basic concept of stringing together presentation elements on the Cue Sheet. It is also the only package to offer MIDI support—a significant feature if you are planning to create productions with high-fidelity musical sound tracks. If you know your presentations are going to be self-running shows that don't rely heavily on interactivity, Producer is the perfect choice for assembling precisely timed multimedia productions.

Media to Go

If you don't happen to be a professional artist, musician, sound technician, or cinematographer, you can still take advantage of a wealth of canned graphics, sound effects, music, animations, and videos in digitized format. The following list is a sampling of royalty-free media that you can use in your projects.

Animation Clips (with sounds $129, without sounds $99). Media In Motion (415/621-0707). Animations in PICS, Director, or QuickTime compressed on 800K disks.

Backgrounds for Multimedia Volumes I and II (PICT and TIFF format $289 each), **Full Page Images** (EPS format $499), **Marble & Granite** (PICT and TIFF format $349). Artbeats (503/863-4429). Backgrounds on CD ROM.

Desktop Sounds ($99). Q Up Arts (408/688-9524). Sounds in snd resources on CD ROM.

Folio 1 (100 high-resolution images on CD ROM $499.95, 100 medium-resolution images on 1.4MB disks or CD ROM $299.95, 10 medium-resolution images on a 1.4MB disk $39.95). D'pix (614/299-7192). Backgrounds on CD ROM in TIFF format. Backgrounds on high-density disks in JPEG, which expands to PICT or TIFF format.

Hi Rez Audio Volume 1 ($149.95). Presto Studios (619/689-4895). Sounds in AIFF files and SoundEdit and SoundEdit Pro formats on CD ROM.

Industry at Work ClipMedia 2 ($295). Macromedia (415/442-0200). Animations in Director, QuickPICS, and QuickTime; QuickTime movies; PICT graphics; and music and sounds in AIFF files and snd resources on CD ROM.

MediaClips series ($14.95 to $59.95; typically $39.95). Aris Entertainment (503/488-4864). Backgrounds in PICT, QuickTime movies, and sounds as snd resources on CD ROM.

MultiMedia HanDisc ($99). MediAlive (408/752-8500). Animations in Director, backgrounds in PICT, MIDI music, QuickTime movies, and sounds as snd resources on CD ROM.

PhotoDisk Volume III ($295), **PhotoDisk Multimedia Sampler** ($49). PhotoDisk (206/441-9355). Volume III: Backgrounds in TIFF format on CD ROM. Multimedia Sampler: Low-resolution TIFF photos on CD ROM.

QuickClips ($139, part of QuickTime Starter Kit). Apple Computer (408/996-1010). QuickTime movies on CD ROM.

SoundFX published by Gazelle Technology ($179). Educorp Computer Services (619/536-9999). Eight-bit mono and 16-bit stereo (Sound Designer II) sounds on CD ROM.

Stingers ($99). The MusicBank (408/867-4756). Music AIFF files and snd resources, with Redbook 44.1kHz support, on CD ROM.

Wraptures One ($129), **WraptureReels One** ($199). Form and Function (415/664-4010). Wraptures One: PICT and QuickTime textures and backgrounds on CD ROM. WraptureReels One: PICT backgrounds, QuickTime movies, sounds as snd resources, and QuickTime sounds on CD ROM.

MovieWorks

MOVIEWORKS IS ACTUALLY a package of four applications. The core application, Composer, is used to combine various media into presentation format. The three other applications—MW Paint, MW Text, and MW Sound—are editors that you can use to create the elements that will appear in your presentation. Thus, MovieWorks is unique in being a stand-alone product. You can create entire multimedia presentations from beginning to end without relying on other applications to prepare your sounds or pictures. (Of course, you still need other software and hardware if you intend to create your own QuickTime movies.) Under System 7, you can open all the MovieWorks editors while still working within Composer, but this requires at least 8MB of memory.

To create a presentation, you import source files—this time they're called *tracks*—into the program's Mediabase, a database of all the sounds, pictures, and QuickTime movies that make up a presentation. Once again, you can set the transitional effects for the entrance and exit of each track, choosing from a menu of 14 effects. There's also a scaling tool that enables you to make individual elements zoom in or out to a predetermined magnification. As in Action, you can make various elements move across the screen on paths you define.

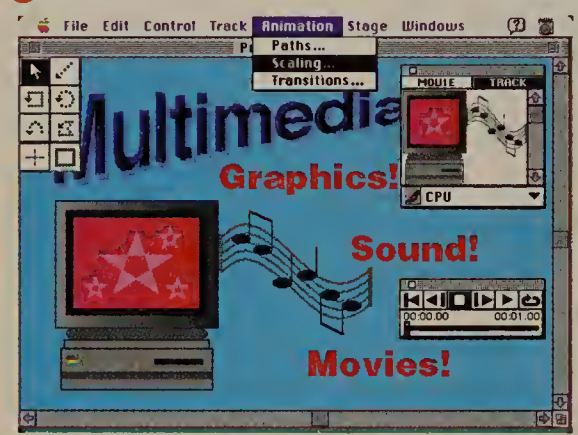
What's missing, however, is a built-in text tool—a real

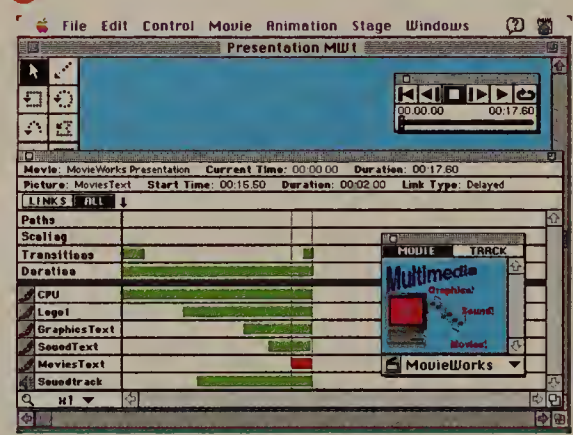
USING MOVIEWORKS

1 Use the program's MW Paint, MW Sound, and MW Text applications to create elements for the presentation or use the Import command to bring in files created in other applications. Each imported file (called a track) is stored in the Mediabase, the small window in the upper-right corner. Once a track is selected, it can be positioned against the screen background. Use the Animation menu to apply movement, transitions, and scaling effects to each track.

2 In the TimeView window, you can examine and adjust the timing of transitional and animation effects for all the tracks in each segment of the presentation.

3 Before playing back the results, you must choose a compression method and compress each segment of the MovieWorks presentation into a QuickTime movie—a step that considerably slows down the process of creating a presentation.





liability, given the fact that most presentations rely heavily on text. Virtually every word you use in a MovieWorks presentation must be imported as a text file or created in MW Text, a separate application.

After you import all the pieces that make up a segment of a presentation, you compress the whole thing into a QuickTime movie, which is then ready for playback.

The biggest drawback here is that in order for MovieWorks presentations to play back at normal speed, they must be compressed into QuickTime format. Even minor changes in the presentation during the editing process necessitate recompression if you want to view the revisions you've made. The result is a lot of waiting as movies slowly get compressed and plenty of switching back and forth between the program's Compose and Play modes to monitor the results.

Furthermore, the version of this program provided to *Macworld* was riddled with bugs. Most irritatingly, the program had a stubborn habit of undoing or inverting transitional effects after the presentations were compressed. Interactive Solutions plans to ship version 1.1 in January. The new version will be free to registered users and will include a separate playback module that can be distributed with finished presentations.

MovieWorks' integrated approach has its pros and cons. If you don't have a color paint program to create PICT images or a sound editor to record and edit sounds, you get them all in one package here. The downside is that, as seems to be true with most all-in-one programs, none of those supplementary applications are very good. The tools in MW Paint are crude and the MW Sound module's features are poorly implemented and hard to use.

On the whole, MovieWorks needs refinement. It makes media integration more complicated and time-consuming than does either Action or Producer. Although it has all the tools you need to create high-quality presentations, the program's interface makes it hard to get the results you want without a lot of patience and experimentation.

Special Delivery

INTERACTIVE MEDIA CORPORATION's Special Delivery is the most slide-oriented of the packages. Special Delivery is largely geared toward creating interactive presentations—those in which a viewer can control the flow of information by clicking on buttons.

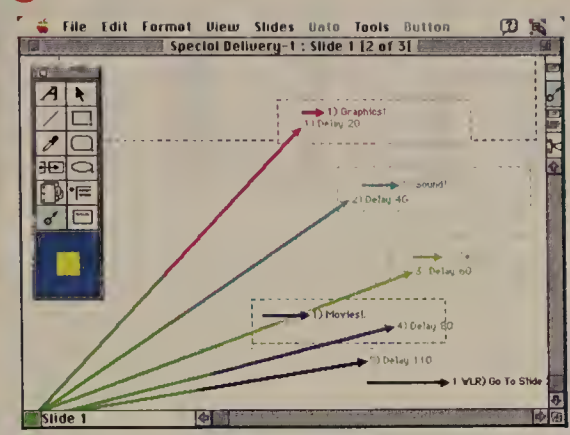
Unlike MovieWorks and Action, Special Delivery offers no built-in features for animating presentations—you cannot have a PICT graphic fly around the screen, for example. Instead, you plug imported pictures, sounds, and movies into stationary *portals*, or frames, on each slide. The *portals* can be round or rectangular and can have their own background and border colors. Animation can be included in a Special Delivery presentation, as long as it's imported as a QuickTime movie.

Composing a presentation with Special Delivery is done in two modes. In the Layout View, you draw the portals and fill them with the elements that will make up the presentation. Creating text portals is especially easy. All you have to do is draw a new portal on the screen and start typing.

For other kinds of media, you use the Place File command to insert files into the portals. Special Delivery imports a wide variety of media formats, including QuickTime movies; PICT, EPS, TIFF, and MacPaint images; and sounds in the AIFF, AIFC, SFIL, and sound (snd) resource formats.

In Button View, you set up the triggers that will activate the various portals. The portals can be set to display their contents permanently or to reveal their contents only after a linked button has been pressed. Buttons can play sounds or movies, restart a presentation, or move to another slide using a transitional effect. In Special Delivery, only 16 transitions are available and each one lasts for a predetermined amount of time; in other words, you can't set up a 3½-second wipe as opposed to a 1-second wipe in Special Delivery, whereas the other programs let you control the transitions' speed.

For an overview of the whole presentation, you can switch to the Map slide for a



USING SPECIAL DELIVERY

1 Use the Format menu to pick a background color for each slide in the presentation. In Layout View, select any of the Portal tools to draw portals, or frames, for each element you want to include. Use the Place File command to insert sounds, pictures, or QuickTime movies into the portals

2 Switch to Button View and use the Button tool to draw links (represented by the solid arrow-tipped lines) between the various portals. Hidden text objects that will pop into view when a button is clicked on are also inserted here. Portals linked to the green Go button (the lower-left corner of the window) will be triggered automatically when the presentation begins. While still in Button View, use the Format menu to apply transitional effects to the button links.

3 Go to the Map slide for an overview of the entire presentation. Drag the Next tool from slide to slide in the overview to determine the sequence in which the slides will be presented in the finished presentation.

thumbnail view of each slide included in the presentation.

Special Delivery's button links allow for a high level of interactivity, but setting them is disorienting because the slides in Button View bear almost no resemblance to their final appearance in the presentation. Background and foreground colors do not appear in Button View; instead, you see a crisscross of arrows representing the links you've created between the various portals. And within each portal you see only the name of an imported file instead of its actual contents. To really see your work, you need to shift to Presentation Mode—where you can't do any editing.

Special Delivery is the only program of the ones reviewed here that doesn't provide a time line on which to plot the occurrence of each event. You can set up time-based presentations using a Delay feature, but it's clumsy compared with the other applications, which allow you to plot the events in real time using the Mac's internal clock. In Special Delivery, all you can do is assign a delay to each button (in tenths of a second) to stagger the appearance of objects or the triggering of transitional effects.

In short, Special Delivery presentations remain interactive slide shows, albeit with movies and sounds linked to each slide. For a wider range of cinematic effects, the other programs offer more options.

Multimedia Choices

IF YOU WANT TO DIVE IN and experience the full range of what multimedia has to offer, Action and Producer are currently your best bets. Neither is terribly hard to learn and both programs provide the tools you need to assemble presentations with style and polish. Producer comes up short in the interactivity department and lacks basic drawing tools, but it offers the best interface. Action enables you to build interactivity into your presentations, offers the animation features lacking in Producer, and comes with a training video.

All the programs described here are relatively inexpensive, but if $400 or $500 still seems too steep a price to pay to experience multimedia, consider this low-budget option: Objectic Systems (206/271-6864) makes a HyperCard utility called Fast Pitch Pro, which enables you to create presentations in HyperCard stacks without using HyperCard's scripting feature. The Fast Pitch interface lacks the refinement of the more expensive multimedia products, but it lets you weave color pictures, QuickTime movies, and digitized sounds into interactive HyperCard presentations—all for just $79.95.

Also, be assured that multimedia is a rapidly growing field. In the coming months there are likely to be far more options for multimedia neophytes. As this article was being completed, a new presentation package was already on the way: Gold Disk's Astound (310/320-5080), a $399 multimedia package that has much in common with Action.

Remember that creating your first multimedia presentation with any of the packages described here is relatively simple. Creating a presentation that looks professional and does exactly what you want it to do can be downright tricky. You have to experiment liberally, and you must respect the limits of your CPU to get the kind of results that really make multimedia worth the time and effort. With a little practice, a little patience, and a touch of directorial flair, it won't be long before you will be able to turn out eye-catching presentations that will keep your audience impressed, informed, and—best of all—awake. **m**

JOSEPH SCHORR is a newspaper reporter, playwright, and technical writer—which covers several media right there.

MW EDITORS' CHOICE

Action Macromedia's entry-level package provides powerful media-integration tools with enough flexibility to create anything from self-running slide shows to interactive presentations with movies and sound. It's a little more expensive than some of the other packages, but it provides the best overall introduction to multimedia. **Company:** Macromedia. **List price:** $495.

Passport Producer Passport Producer's elegant graphical interface is a pleasure to use. While the program lacks the tools you need to create fully interactive presentations, it offers the best features for precision synchronization of sounds, pictures, and movies. Its MIDI support makes it the perfect choice for creating presentations with high-fidelity musical sound tracks. **Company:** Passport Designs. **List price:** $495.

Multime

A GUIDE TO THE PROS AND

BY NICK WEST

Multimedia options abound. Scores of applications boast multimedia features (such as the ability to include animation or sound clips), and a host of simple multimedia authoring programs for beginners or occasional users have recently emerged. A few programs leap ahead of all the others in two ways: *integration* and *extensibility*.

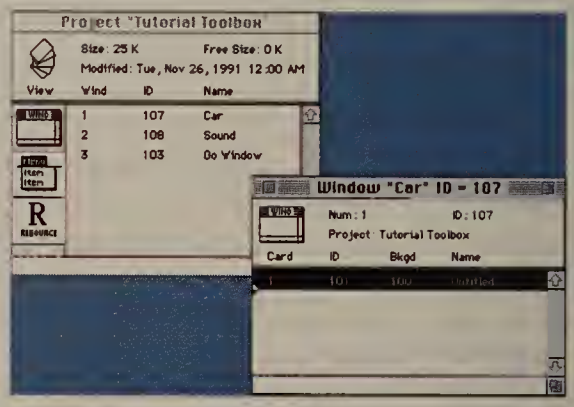
Each program in this table can tackle large projects that integrate any combination of video, animation, sound, graphics, and text. These programs can take user input into data fields and manipulate that data. And each of these programs can be extended to control external devices, such as videodisc

SCRIPTING LANGUAGE
The primary tool for controlling the program's features.

Aldus SuperCard 1.6
Aldus Corporation

$299
619/695-6956
800/333-2538

Innovation rating: 3
Value rating: 4



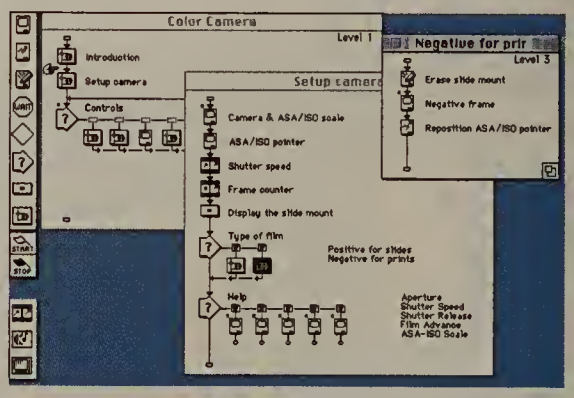
SuperEdit Windows SuperEdit—the authoring portion of Aldus SuperCard—uses a set of easy-to-navigate windows, but is split off from the main program, creating needless confusion.

SuperTalk is based on HyperTalk, so HyperCard users will feel at home here. The language has many improvements, though, including control over Apple events.

Authorware Professional 1.7.1
Macromedia

$8000
415/956-4091
800/288-4797

Innovation rating: 4
Value rating: 1



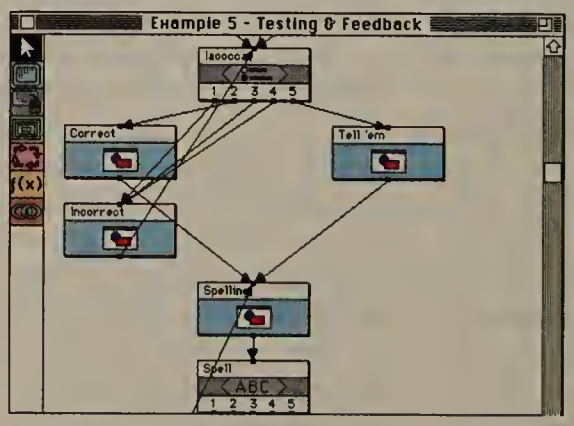
Authorware's Flow Icons These icons form a collapsible map that makes big projects easy to keep track of.

Authorware's icons and dialog boxes replace a scripting language, decreasing flexibility but sometimes making the product easier to use.

Course Builder 4.0
Discovery Systems International

$1495
615/690-5600

Innovation rating: 2
Value rating: 3



Course Builder's Map The map gives a clear view of an entire project, and how its parts are linked.

Course Builder uses a series of dialog boxes in place of a scripting language. But its dialog boxes generally offer less flexibility and fewer choices than those in Authorware.

dia Masters

CONS OF SEVEN POWERFUL AUTHORING PROGRAMS

MEDIA INTEGRATION How does the program handle external devices, such as videodisc players?	HANDLING GRAPHICS AND ANIMATION How well does the program create and integrate visuals?	BEST AND WORST USES Where does the program shine; where is it out of place?	UNIQUE ADVANTAGES Things that only this program does well.	BIGGEST SELLING POINTS AND BIGGEST BLUNDERS Pearls of wisdom and pitfalls to avoid.	WHAT'S MISSING? Most embarrassing holes in the product.
SuperCard takes the same approach as HyperCard: add whatever device controls you need in the form of XCMDs. SuperCard uses the same XCMDs as HyperCard.	Unlike HyperCard, SuperCard has built-in color—a big advantage. Several ink effects are available, and there are draw tools as well as paint tools. SuperCard also has some animation controls, though they're not as sophisticated as Director's.	SuperCard is great for projects where color is needed, but not for animation. The program also works well for data-intensive applications or where separate windows would be useful. If you need speed, however, look elsewhere.	SuperCard can convert all HyperCard stacks and can control separate windows within a single application. SuperCard's lists of cards and windows are useful in project management.	SuperCard is almost everything HyperCard should be: a card-based program with a good scripting language, support for color, and the ability to open multiple windows simultaneously. But it's slow. SuperCard is split between run-time and authoring programs, each with its own tools, creating needless confusion.	SuperCard needs a unified program environment and more integral QuickTime support (although you can use the Claris XCMD set).
Authorware leads the field in built-in media integration: videodiscs can be controlled from within the program, which includes a videodisc controller for the end user. Authorware can also run HyperCard XCMDs to control other devices, such as CD ROM players.	Authorware easily handles colors, and its animation tools are second only to those of Director. You control graphics and animation entirely through dialog boxes, which are simple to use.	Authorware is superb for training and education. But the learning curve is steep, even for developing simple presentations.	Authorware has a Windows version that makes cross-platform development fairly straightforward. A collapsible icon-based flow-line map aids greatly in keeping track of projects.	Authorware handles testing options and student tracking exquisitely. The program also allows easy trial runs of a specific portion of the project. Authorware falls down with its outrageously high price—due to its history as a niche training tool for big corporations.	Authorware could profit from integral support for CD ROM players and interactive VCRs; it doesn't support 32-bit mode and lacks a scripting language.
Course Builder has no built-in support for external devices, but can use HyperCard XCMDs.	Course Builder has several levels of animation control, including editing animation paths and interpolating between the start and end points of an animation (*tweening*); but Course Builder's controls are not as good as Director's.	Course Builder is good for student testing and tracking at a fraction of Authorware's price. Not much good for anything else.	For simple projects, Course Builder's Course Map gives a clear view of what your entire project looks like and how its parts are linked.	Course Builder combines student testing and tracking with decent animation tools, and it runs over a network. But its dialog boxes can't efficiently or flexibly handle complex procedures.	Course Builder badly needs integral support of QuickTime, and some way to translate the project to Windows.

players and CD ROM drives.

The price of integration and extensibility is complexity. These programs involve sometimes-steep learning curves; some can only be mastered completely by a dedicated multimedia professional. So why go to the trouble?

These programs can accomplish far more elaborate jobs than the creation of a simple boardroom presentation. They can mirror your organization's needs and grow as your requirements grow. Although each program aspires to be all things to all multimedia users, don't be fooled; depending on the requirements of your specific project, some products save the day while others waste precious time.

To develop an employee-training program, first check out Authorware Professional, Course Builder, or Test Factory. Each has unique capabilities to generate tests, track test scores, or archive student data. But if your advertising agency or engineering firm needs the best program to handle high-end graphics and complicated animations, consider MacroMind Director, which lives to set multimedia objects in motion. For colorful displays for universities or museums, Aldus SuperCard and Spinnaker Plus make an easy fit. And for handling a group of projects that incorporate a diverse range of tasks, HyperCard—the product that popularized multimedia—offers the uniformity and flexibility for the job.

To help you decide, we include two subjective ratings, each based on a 1 (worst) to 5 (best) scale: *innovation*, or how well the product has kept current with the latest multimedia features; and *value*—a combination of price, features, and overall performance. **m**

NICK WEST is president of Media 360, an independent multimedia production company in San Francisco.

SCRIPTING LANGUAGE
The primary tool for controlling the program's features.

HyperCard 2.1
Claris Corporation

$199
408/727-8227
800/628-2100

Innovation rating: 2
Value rating: 4

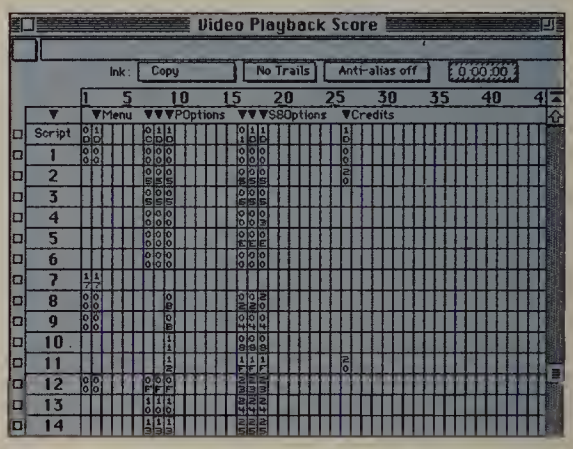
HyperCard Goes Recent HyperCard provides convenient thumbnail sketches of the last 40 cards a viewer has browsed.

HyperTalk is the standard against which other scripting languages are judged. Complete, easy to follow, and easily extensible with XCMDs and XFCNs (*external commands* or *external functions*, mostly sold by third parties).

MacroMind Director 3.1
Macromedia

$995
415/956-4091
800/288-4797

Innovation rating: 4
Value rating: 4



Director's Score The Score window shows a chronological overview of the entire animation.

Director's Lingo can do almost anything, but at the cost of complexity. Recent changes make it more similar to HyperTalk, but the twists Lingo takes to do some simple things (like making objects appear or disappear on a single frame) leave programmers shaking their heads.

Spinnaker Plus 2.1
Spinnaker Software

$495
617/494-9148

Innovation rating: 2
Value rating: 3

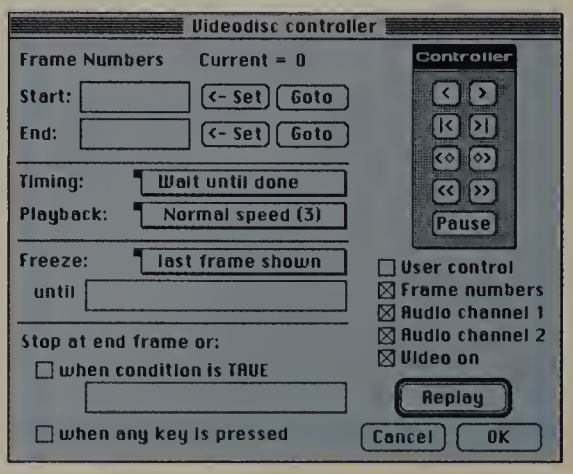
Plus Tool Palette Spinnaker Plus provides a movable ribbon of currently available tools.

Spinnaker's Plus Programming Language (PPL) is a superset of HyperTalk. Plus can only convert HyperCard 1.X stacks, though, so any functions specific to more-recent versions of HyperCard are unavailable.

Test Factory 2.1
Warren-Forthought

$939
409/849-1239

Innovation rating: 3
Value rating: 3



Test Factory Controls The devices Test Factory can drive are limited to videodisc players and VCRs.

Test Factory's MacroScript is closer to standard programming languages than the other products' scripting languages are. It's cryptic and hard to learn, and doesn't necessarily deliver more power.

MEDIA INTEGRATION How does the program handle external devices, such as videodisc players?	HANDLING GRAPHICS AND ANIMATION How well does the program create and integrate visuals?	BEST AND WORST USES Where does the program shine; where is it out of place?	UNIQUE ADVANTAGES Things that only this program does well.	BIGGEST SELLING POINTS AND BIGGEST BLUNDERS Pearls of wisdom and pitfalls to avoid.	WHAT'S MISSING? Most embarrassing holes in the product.
HyperCard is the ultimate erector set. You start with a simple program (which doesn't control *any* device) and add easily available XCMDs that can control devices such as CD ROMs, videodisc players, and VCRs. If a device can be controlled by a Macintosh, chances are a HyperCard XCMD is the control method that the manufacturer will offer first.	HyperCard's weakest link. It offers no draw tools, and adding animation can be done only with third-party XCMDs. Adding QuickTime movies is fairly easy, though.	HyperCard is a product for beginners and nonprofessionals of all stripes. It can also do the job on complex projects because of HyperTalk's flexibility. But look elsewhere for presentations that require intensive color and animation.	HyperCard created the mold for scripting languages—many other programs now use HyperTalk and XCMDs as a standard.	HyperCard's great strength lies in its ability to create simple projects quickly. It fails in its inability to add color except through clumsy XCMDs. And finding a particular script—between buttons, fields, cards, backgrounds, and several possible stacks—can be a daunting proposition.	HyperCard is missing color, overall stack map, color, more than two graphic layers, and color.
Like HyperCard, Director can only control external devices through add-on modules; Director calls them XObjects. Director can also use most XCMDs.	Director's strong point. It can import PICT, PICS, other Director movies, and QuickTime movies. Excellent (though complicated) controls over animations are the program's defining feature.	Director is great for presentations and other projects needing color, movement, and pizzazz. But avoid it for data-intensive applications (although you might consider running Director movies from a HyperCard base).	Director's visual, time-based Score window gives an overview of your entire project.	Director excels at complex, interactive animations, but can be hard to learn. Inexplicably, saving a file after even a minor change takes ages. Moreover, Director crashes frequently during program development unless you regularly "purge" RAM with an awkward option-*key* command. And it can be hard to keep track of your project.	Director could use better control of objects in its Cast window, and it needs other places to put formatted scripts besides the Movie Script, which fills up too fast!
Plus mimics HyperCard: add whatever device controls you need in the form of XCMDs. It also uses the same XCMDs as HyperCard (though no 2.X-specific XCMDs work with Plus).	Color is built directly into Plus, giving it an advantage over HyperCard. Plus features draw and paint tools and the ability to switch color palettes. But it has no built-in animation capability other than card-flipping.	Plus is a fine tool for simple color projects that need to run on Windows machines as well as Macs. But for animation-intensive applications, pass Plus by.	The Plus library feature allows easy recycling of commonly used routines.	Plus uses color easily and delivers much zippier performance than SuperCard. Plus easily translates stacks to its Windows version. But Plus can't cut and paste cards to different locations in a stack, or open multiple stacks at the same time. And Plus presents a needlessly confusing array of fields for word processing, data entry, and plain text.	Plus feels like yesterday's news. It's not 32-bit clean, and without the special windowing features of SuperCard or animation tools of Director, Plus will continue to be a poor substitute for more-robust programs.
Test Factory controls some videodisc players and interactive VCRs automatically. Since it isn't compatible with HyperCard XCMDs, however, these are the only two external devices you can use.	Test Factory handles color graphics easily, and can run Director animations. But other than card flipping, it has no animation tools of its own.	Test Factory is specifically oriented toward automatically creating tests. Don't try it for complex projects requiring a lot of scripting or data manipulation.	Test Factory creates interactive tests directly from text-only files.	Test Factory competently handles relatively simple testing and tracking for less than one-eighth the price of Authorware. But its failure to support XCMDs limits its flexibility. Test Factory maddeningly insists on placing all program-related files in a single folder.	Test Factory needs a smoother, more intuitive scripting language.

MULTIMEDIA

Sound Advice

HOW TO ADD AUDIO TO

BY JIM HEID

Sound helps put the *multi* in *multimedia*. On-screen text and moving images may seem impressive, but so did the first silent movies. When synchronized motion-picture sound tracks appeared, silent films suddenly seemed archaic and less engaging. Will your audience feel this way about your silent production?

Sound can entertain, enliven, and educate. Background music sets the mood for a three-dimensional animated walk-through of an architect's latest design. A sound bite from the lead engineer helps focus attention on a new-product briefing. Recordings of musical instruments in an educational HyperCard stack let kids hear the instruments they see on the screen.

There are several ways to add the dimension of sound. The least expensive technique involves using the Mac's built-in sound circuitry for recording and playback. (A Mac that lacks a microphone requires additional hardware, such as a Macromedia MacRecorder, to record sound.) Mac-generated audio won't sound like a compact disc, but played through high-quality speakers, the Mac audio can sound surprisingly good.

All major presentation, multimedia-production, and authoring programs can play sounds. Given that, your choice of a production program depends on the nature of your production. For slide-show–style presentations, you should probably choose Aldus Persuasion or Microsoft Pow-

WARD SCHUMAKER

erPoint. For interactive, hypertext-oriented projects, you might choose Claris HyperCard, Aldus SuperCard, or Authorware's Authorware Professional. For video-oriented QuickTime productions, there are programs such as Adobe Premiere and DiVA VideoShop. For ambitious productions that involve combining animation, titles, QuickTime clips, and multiple sound tracks, you might choose Macromedia's MacroMind Director or MediaMaker or Passport Designs' new Passport Producer, which was in development at this writing.

Although all of these programs support sound, none of them provide extensive features for editing and otherwise fine-tuning a sound track. There's a parallel in the publishing world: Aldus PageMaker and QuarkXPress support color graphics but they don't provide extensive retouching and modification features. For altering graphics, you need a program such as Adobe Photoshop. Likewise, for preparing digital sound, you need a sound-editing program.

The best program for recording and fine-tuning sound that will be played through the Mac is Macromedia's SoundEdit Professional. It's included with the MacRecorder Sound System Pro and is also sold separately for use with Macs that include a microphone.

YOUR MULTIMEDIA PRESENTATIONS

First Steps

Step 1: Get good speakers. Adding sound means adding hardware. At least buy a set of speakers or commandeer a stereo system—the Quadras aside, no Mac contains a speaker worthy of anything beyond beeps. A set of compact amplified speakers such as Bose Corporation's Video-Roommates ($339 per pair), Roland Corporation's Micro Monitor ($290 per pair), or Monster Design's Mac-Speaker ($249 per pair) provides excellent sound quality. If your production will be shown in a hotel or convention center conference room, you can probably tap into the room's public-address system. If your Mac is just a few feet from a stereo system, you can connect the Mac to the amplifier's line-input jacks by using a cable such as Radio Shack's 42-2444 for monophonic Macs or 42-2475 for stereo Macs.

Step 2: Connect to external speakers. When connecting the Mac to an external sound system, first turn the amplifier's volume all the way down, and then use the Mac's Sound control panel to turn the Mac's playback volume all the way up. Finally, adjust the amplifier's volume for a comfortable listening level. This provides the best signal-to-noise ratio and thus the clearest sound output.

Recording

ADDING SOUND ALSO MEANS wearing another hat. You may already be playing photographer, videographer, graphic artist, writer, and producer. Recording your own sound tracks means becoming a recording engineer, too. As we'll see shortly, you can bypass much of the work by using prerecorded music clips, but it still helps to understand technicalities such as volume levels and sampling rates.

Tip Digital audio uses prodigious amounts of hard drive space—about 1.3MB per minute of medium-quality monophonic recording. If you plan to work with lengthy sounds, you may need to buy a bigger hard drive—a 200MB or 400MB drive wouldn't be overkill for lengthy productions. If you create smaller productions, consider a removable-media device such as a SyQuest or Iomega Bernoulli drive (see "Removable Storage," *Macworld*, November 1992).

Step 1: Check the recording level. Let's say you need to record a few seconds of narration—perhaps the CEO saying a few words about the firm's latest quarterly results. Before you hit SoundEdit Professional's Record button, click on the Controls palette's level-test button and adjust the recording level. If the level is too high, loud portions of the sound will be clipped and sound distorted (see "Setting Levels"). If the level is too low, the sound won't be loud enough and background noise and any digital noise will be proportionally louder. If you're using a MacRecorder, you can also adjust the recording level using the volume knob.

Tip If changing the levels in SoundEdit Pro doesn't do the trick and you're using the microphone that came with the Mac, your narrator will need to speak more loudly or more quietly, or you'll need to adjust the position of the microphone.

Step 2: Position the microphone correctly. Locate the microphone at least a few inches from the narrator's mouth to avoid breathy results. As a test, record the phrase "pretty poppies"—if the result sounds like a hurricane, back off. Finally, move the microphone as far away from the Mac as possible to avoid recording hard drive and fan noise.

Tip If, after moving away from the Mac, you're still picking up Mac noise, turn off the Mac and use a high-quality audiotape recorder to make the recording. Then, connect the recorder's line-output jacks to your Mac or MacRecorder and digitize the results.

Step 3: Choose a sampling rate. Use SoundEdit Professional's Sound Format command to choose the desired *sampling rate*—the number of times per second that the Mac analyzes,

Sound and Premiere

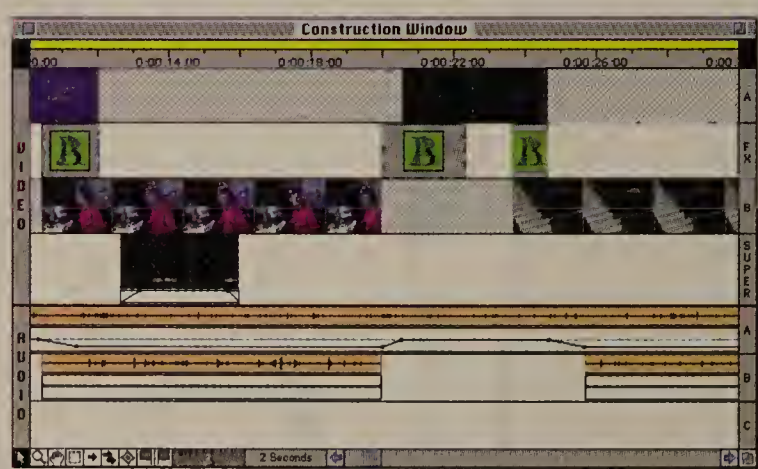
For many of today's multimedia producers, QuickTime is where the action is. Unfortunately, synchronization of sound and video tracks is often poor—many QuickTime talkies look like English-dubbed foreign films. According to Apple, this occurs because QuickTime concentrates first on playing sound without distracting interruptions; QuickTime discards video frames when necessary in an attempt to maintain synchronization. Another problem: if a QuickTime movie starts with a sharp, percussive note, part of the note is often cut off during playback.

But QuickTime's handling of sound will improve as QuickTime and the Mac family evolve. With this rosier future in mind, here's a look at the issues and options behind working with sound tracks in the most popular video-editing program, Adobe Premiere.

How to Premiere can record audio and video simultaneously if you have a microphone-equipped Mac or a Macromedia MacRecorder. You can also record voice-overs and music within Premiere, using the Sound Settings dialog box to adjust levels and choose sampling rates. However, it's often easier to use SoundEdit Professional, which is faster and has better editing features. If you use SoundEdit Professional, save the sound in AIFF format and use Premiere's Import command to bring the sound into the Project window. Then, drag the sound to the Construction window.

Premiere has three sound channels and excellent mixing features. Each audio clip has a fade control; to adjust the level of an audio track, drag its fade control up or down. You might start a movie with a music score playing at full volume and then fade the music to 50 percent volume as a voice-over or talking head begins speaking (see "Sound Premiere"). You can perform similar volume adjustments using SoundEdit Professional's Envelope dialog box.

For faster Premiere performance, use the Preferences command to turn on the audio-approximation feature.



Sound Premiere Adobe Premiere lets you adjust the level of up to three audio tracks. Here, a music score in track A is faded to 40 percent of its normal volume as a narration begins in track B. When the narration ends, the music resumes its normal volume, and then fades again as the next voice-over begins.

or *samples*, the sound. The higher the rate, the better the sound quality. Stock Macs are limited to a maximum rate of 22kHz, or roughly 22,000 samples per second. That's adequate for voice or music, although it's still half a compact disc's sampling rate.

Tip If you're recording a voice, consider using an 11kHz rate—the quality won't be that much worse, and the sound will use half the disk space. Make a test recording at both rates and let your ears decide. If the production will play in a noisy setting, you might not notice the difference. One way to get near-22kHz quality in files the size of 22kHz files is to record the sound at 22kHz and then use Ricardo Ettore's SoundMover shareware program to drop half the data bits (press ⌘-option while you click on the Copy button in moving the original data to a new file).

Step 4: Record. Only now are you ready to record: Click on the Record button.

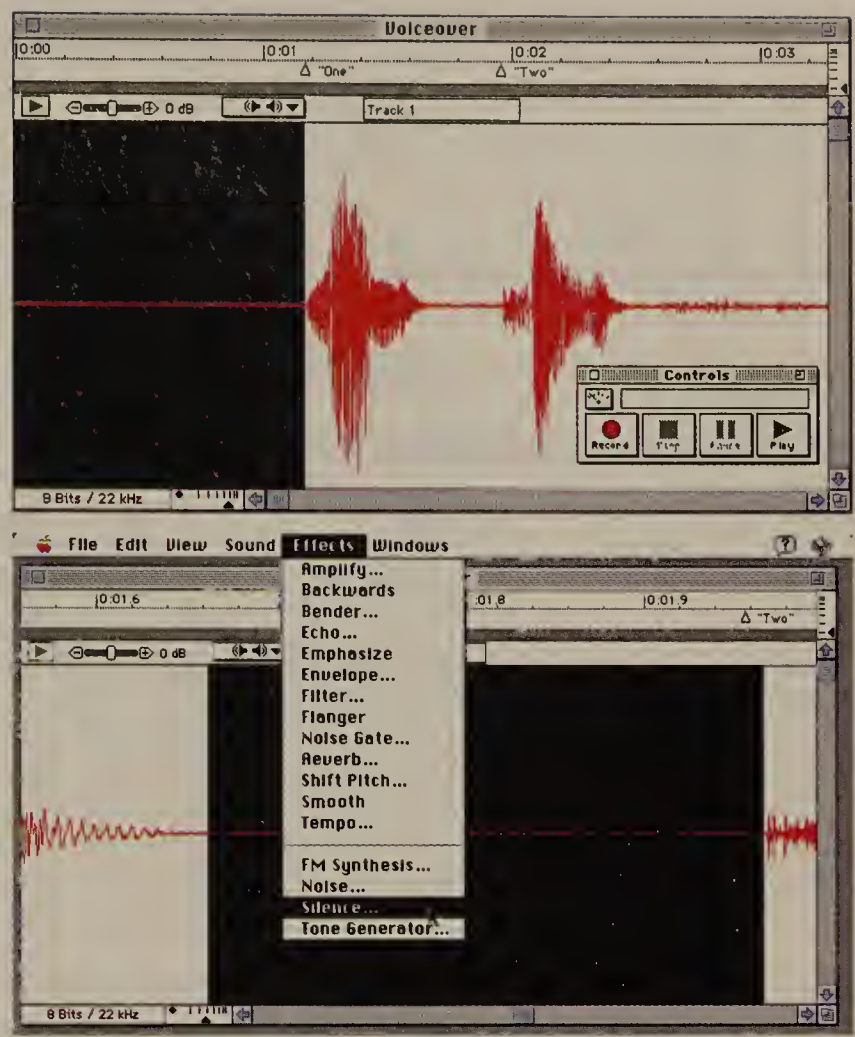
Tip One way to ensure top-quality recording is to record from a good pair of headphones, like Sony's MDR-24. You'll have to experiment a little to find out the best position of the headphone vis-à-vis the microphone, but once you do, you'll get clearer recordings, with less background noise and fuller range.

Editing

WHEN YOU FINISH RECORDING, the new sound's *waveform*, the graphic representation of a digitized sound, appears in the SoundEdit Pro window. At this point, you can perform a variety of modifications to the sound—trimming its beginning and ending to eliminate silence and save hard drive space, or removing a fumbled word or a lengthy pause between sentences (see "Editing Sound").

You can also apply a variety of special effects, such as reverb, flanging, and echo. The results sound a bit cheesy, though. If you need special audio effects, you'll get better results with an external effects box such as a $249 Alesis MicroVerb III, available at music dealers.

If you're working with canned music clips instead of recording original sounds, your job begins at the editing phase. A large selection of canned music is available (see "Background Music Options"). For playing back music through the Mac, I recommend Macromedia's ClipMedia series of CD ROMs. Each CD ROM includes nicely done music clips in a variety of styles and formats, including 11kHz and 22kHz as well as mono and stereo. Visual clips are included, too. You can also digitize your own music clips from any commercial audio source, such as a favorite CD.



Editing Sound After recording, remove the silence that precedes the beginning of a sound to save disk space and ensure that the sound begins at the appropriate time. Top: Roughly one second of silence has been selected in Macromedia's SoundEdit Professional. To delete the selection, press the delete key. Bottom: Silence is as hard for the Mac to reproduce as sound. Note the slight waviness in the selected passage—when played, it sounds like static. To fix the problem, select the portion that should be silent, then choose SoundEdit's Silence command. For smooth results, you might want to use the Envelope command to introduce a brief fade out and fade in on either side of the silence.

Tip Copyright and licensing restrictions apply to canned as well as commercial music. You can't put copyrighted music in a commercial production any more than you could use a copyrighted photograph in a publication. A rule of thumb is that if people are paying to see the presentation—even as clients—it's a commercial presentation.

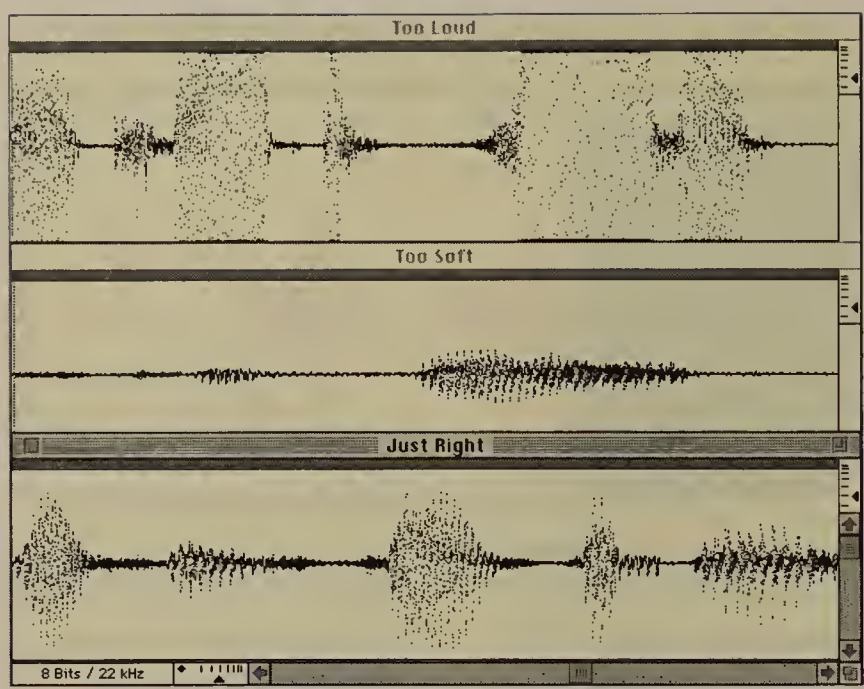
Tip One common modification involves fading a music clip after a specific amount of time. Select the last several seconds of the clip's waveform and then choose the Envelope command. Drag the handle in the right-hand side of the envelope all the way to the bottom of the track window and click on OK. Try to time the fade-out so that it ends at the end of a verse.

Sound and Persuasion

The *voice-over* is a common device: a graph or other image appears while a voice elaborates on it. You can apply this technique to simple presentations created with Aldus Persuasion.

How to Persuasion 2.1 supports sound via QuickTime, so you must convert AIFF (a standard sound format) files into QuickTime movies using Apple's Movie Converter utility. Next, open the presentation and import the QuickTime movie into the appropriate slide: in Persuasion, use the Import command. To play the movie automatically when the slide containing it appears, choose Preferences from Persuasion's File menu and check the Play Movies box.

(You can add sound to Microsoft PowerPoint 3.0 presentations using similar techniques.)



Setting Levels The sound in the top window was recorded at too high a volume setting—note how the waveform seems to crash into the upper and lower edges of the display. The sound in the middle window is too quiet—notice that the loudest portions of the waveform aren't that much louder than the background noise. The sound in the bottom window was properly recorded—the waveform peaks almost reach the top and bottom of the display.

Tip You might also want to create a *loop point* in the file—a passage (such as one verse) that plays more than once. You can use loop points to extend a clip's duration without increasing its size on disk. To create a loop point, select the portion you want to loop (repeat) and choose Set Loopback from the Sound menu. You can fine-tune the loop point by dragging the waveform window's loopback markers.

Tip Many multimedia applications involve mixing sounds—perhaps to combine a recorded voice-over with a prerecorded music clip. You can use SoundEdit Professional's Mix command to combine multiple sound documents or tracks, but whether you should depends on the program that will play the final sound. If you're using a program that provides multiple audio tracks—MacroMind Director, MediaMaker, Passport Producer, Adobe Premiere—consider using that program to do your mixing. That way, you can fine-tune the mix without returning to SoundEdit Professional. On the other hand, if the sounds will be played by a program such as HyperCard, which plays just one sound at a time, do your mixing in SoundEdit Professional.

Tip A final tip: When mixing, editing, and processing sounds, try to use the speakers that the final product will play on. Listen from various points in the room where you'll give the presentation and at various sound levels. That's the best way to judge how the final product will sound.

Saving

AFTER YOU CREATE OR EDIT A sound, you need to save it. A variety of file formats exist in the sound world—just as a range of graphics formats exists.

Tip Most multimedia production programs require you to save sounds in AIFF format. AIFF, short for audio interchange file format, is a standard file format for audio—just as TIFF is a standard file format for graphics.

Tip If you're saving sounds for use in HyperCard, you need to save them as sound (snd) resources. First,

BACKGROUND MUSIC OPTIONS

Background music is usually inappropriate for live presentations—it distracts the audience and discourages questions. But background music adds polish to unattended productions that will run at, say, a trade show or retail store. Canned production music for any mood is available in several formats. If you use canned music, you'll find that different techniques have advantages and disadvantages that you need to consider up front.

Technique	Pros	Cons	Tools
Digitized music clips played through the Mac's sound circuitry	Inexpensive; you can move productions to another Mac without adding sound hardware to the destination machine	Sound isn't CD-quality; digitized clips use up hard drive space	For older Macs, a MacRecorder; for newer Macs, appropriate cables. Optional: a CD ROM drive and clip music collection (Macromedia MediaClips recommended)
Music clips played through Digidesign's Audiomedia II board	CD-quality sound; board can be used to record and mix voice-overs, too; board includes Sound Designer II sound-editing program	Costly (Audiomedia II retails for $995); CD-quality stereo sound requires 20MB per minute; sound plays only on Audiomedia II–equipped Macs	Audiomedia II; a CD ROM drive and Digidesign's ClipTunes (SoundDesigner format production music)
MIDI music sequences played through sound modules	CD-quality sound; MIDI sequences use very little hard drive space	More hardware to buy and transport; must use MIDI Manager in most production programs	MIDI sound module (see text); MIDI interface; amplification system; clip music collection (often available from online services and user groups)
Conventional CD audio played through a CD ROM drive under control of a HyperCard stack and The Voyager Company's CD AudioStack software	You can play tracks from any CD, in any order; you can create interactive stacks that play passages when buttons are clicked or that display running comments during playback; CD audio uses no hard drive space	You must work in HyperCard 2.1—not always the ideal multimedia production tool	Voyager CD AudioStack software; CD ROM drive; HyperCard 2.1; any audio CD

save the sound in SoundEdit Professional's native format. (You may want to modify the sound down the road.) Next, choose SoundEdit Professional's Save As command and choose Resource from the File Format pop-up menu. Type a name for the resource, and then locate and select the stack in which you want to install the resource.

Tip If you're using Macromedia's MacroMind Director, you might want to save short sounds as resources stored within Director's Sound file for easy access (see "Sound and Director").

Advanced Audio

WHAT ARE THE WEAK LINKS in the Mac's audio chain? The Mac's audio circuitry is one. It doesn't sound bad, but it's far from CD-quality.

Tip For CD-quality audio, you need a $995 Digidesign Audiomedia II board, which contains a Motorola DSP56001 digital signal processing chip—the same chip that Next computers have used since their debut. Audiomedia II includes Sound Designer II, a kind of super SoundEdit software that lets you record, edit, and enhance CD-quality audio. Digidesign also sells ClipTunes, a $195 CD ROM of production music in Sound Designer II format.

Tip If you use background music extensively, you might investigate the MIDI angle. MIDI stands for Musical Instrument Digital Interface, and it is a standard method for connecting music synthesizers to each other and to computers. Several firms sell MIDI sound modules—essentially synthesizers without keyboards—that you can connect to the Mac. You can use one of these boxes to play MIDI *sequences*, which are the MIDI equivalent of player-piano rolls—instead of storing actual sounds, sequences store information about which notes (actually, which pitches at what durations) should be played. The advantage is efficiency: a MIDI sequence uses only a fraction of the hard drive space that is required by digital audio. You can store and play MIDI sequences using most multimedia production programs, although you often have to use Apple's sluggish and somewhat awkward MIDI Manager and Patch Bay software.

Tip If you're into QuickTime, your options are more limited. Digidesign's Audiomedia II is incompatible with QuickTime, although Digidesign says the two will be compatible soon. Also, the current version of QuickTime lacks a specific track for MIDI data, so integrating MIDI sequences into QuickTime movies is a cumbersome process. (A future version of QuickTime will provide a track for MIDI data, Apple says.)

In the main, however, the key tools for multimedia sound are here now. And Apple is listening, as evidenced by the fact that an internal CD ROM drive is available for the Quadras, Performa 600, and IIvx—and that you can play and record audio from a CD using these models' built-in sound circuitry. Sound may take a back seat to pictures in the Macintosh world, but at least it's along for the ride. **m**

Contributing editor JIM HEID grew up in his father's recording studio, and has retired his razor blade and splicing block in favor of digital editing. He is the author of *Macworld Complete Mac Handbook* and *Macworld Guide to Word 5* (IDG Books Worldwide, 1992), and coauthor of *Inside the Apple Macintosh* (Brady, 1992).

Sound and Director

Macromedia's MacroMind Director provides two sound channels, so you can combine sounds, putting background music in one channel and a voice-over in the other, for example.

How to MacroMind Director provides a few ways to import sound. You can use the Import command to add a sound to the Cast window and then drag the sound from the Cast window to the desired sound channel in the Score window. If you will use a sound in several Director productions, you can save memory and hard drive space by adding the sound to a shared cast movie as described in Director's documentation. You can also install sound resources in Director's Sound file; this option is best for sound effects and other short sounds.

When you start playing sounds in one channel and then introduce a sound from the second channel, the volume of the first channel drops by about half. If you want the volume of both sound channels to be the same throughout the movie, put the null sound (included with Director) in all the empty sound channel cells. You can also control the volume of each channel using Director's Lingo scripting language.

WHERE TO BUY

Adobe Systems
Adobe Premiere;
408/961-4100,
800/833-6687.

Aldus Corporation
Aldus Persuasion, Aldus SuperCard;
206/628-6594.

Alesis
MicroVerb III;
213/647-8000.

Apple Computer
QuickTime Starter Kit, Movie Converter;
408/996-1010.

Bose Corporation
Video Roommates;
508/879-7330.

Digidesign
Audiomedia II, ClipTunes;
415/327-8811.

DiVA Corporation
VideoShop;
617/491-4147.

Macromedia
MacroMind Director, MediaMaker, ClipMedia, MacRecorder Sound System Pro, SoundEdit Professional;
415/442-0200.

Microsoft Corporation
PowerPoint;
206/882-8080.

Monster Design
MacSpeaker MS-1;
415/871-6000.

Passport Designs
Passport Producer;
415/726-0280.

Roland Corporation US
Micro Monitor;
213/685-5141.

Some of our favorite drives include the well-designed Mass Microsystems DiamondDrive (top), the speedy FWB hammer 525FMF (middle), and the bargain-priced APS Technologies 520MB drive with a Fujitsu mechanism (bottom).

MIDSIZE HARD DRIVES

Macworld Lab tests 84 hard drives from 200MB to 520MB

BY MATTHEW R. CLARK

Nowadays it's the rare Macintosh user who doesn't need more hard drive space. As any graphics professional, programmer, database administrator, or avid computer-game player can tell you, even if you don't require additional storage now, you're going to need it later. Application developers that were once respectful of a paltry 20MB hard drive now assume that everyone has an abundance of hard drive space. QuickTime movies and Adobe Photoshop files routinely reach 10MB, 20MB, or even 50MB. Add to that a decent-size font library, system extensions, and utilities, and before long you're out of space and out of luck. The question is how much additional storage should you buy, and from whom?

The last time *Macworld* tested midrange hard drives ("Seeking Midrange Hard Drives," February 1992) the category included drives with capacities from 120MB to 220MB, with prices from $439 to $2549. The increasing appetite for storage has changed our def-

Liberty Systems offers drives that are small enough to be put in a briefcase and carried from work to home. You can even get them in two case colors—one to match the Mac and one in stylish black.

inition of midrange. This time, Macworld Lab tested 84 drives between 200MB and 520MB in size, with list prices as low as $548 for the MacDirect 212MB hard drive and as high as $3099 for the Microtech Nova 500MB drive.

All hard drive vendors assemble their drives using mechanisms they purchase from manufacturers (except for Core International, which makes its own mechanisms and also sells them to other companies). All 84 of the drives we tested, representing the efforts of 31 vendors, contain mechanisms manufactured by Seagate Technology, Fujitsu, Quantum Corporation, Maxtor, Conner Peripherals, DEC, Core International, or Hewlett-Packard. The vendors then put a mechanism—together with a controller board, power supply, fan, switches, cables, and so on—into a metal or plastic case, and market them to the public either directly or through dealers. So although your purchase decision should be based primarily on speed, capacity, reliability, and price, other factors come into play—attributes such as case design, noise, warranty, and technical support can tip the balance in what's often a close race.

More than a Mechanism—Construction and Design

CHOOSING A CASE DESIGN IS A MATTER OF DECIDing which best fits your work environment. The drives we tested have cases that fall into three categories—zero footprint, vertical, and transportable. Zero footprint is the design of choice if you use a compact Mac, such as an SE, SE/30, Classic, or Performa 200. The box usually measures about 2 inches high and fits squarely under these Macs, which is helpful if you're short on space. About 70 percent of the drives we tested were zero footprint.

The vertical drives vary in shape and dimensions, but they share a common theme—they're designed to occupy little desk space in a setting that includes a modular Mac system, such as a Mac II, an LC, a Quadra, or a Performa 600. MacWarehouse offers my favorites in this category—the PowerUser Pro 210 and PowerUser Pro 425. The PowerUser Pros come in a tiny but sturdy shoebox-shape case (8 inches long by 3½ inches wide by 5½ inches high). Drives from FWB, Optima Technology Corporation, Procom Technology, Liberty Systems, and Storage Dimensions have feet that enable you to set the drives horizontally or vertically.

The transportables are drives small enough to slip into a briefcase without squishing your peanut butter and jelly sandwich. Liberty's design is the hands-down winner in this category. This pocket-size drive measures in at 7 inches long by 1⅞ inches wide by 4 inches high.

Case material is another important factor. I prefer metal casing for its strength and durability, although most drives use a type of plastic that's sturdy enough for normal use. One exception is the Tulin A-Hive Jr. drives. The flimsy plastic Tulin drives wouldn't be a good choice to stack upon.

FCC Certification

THE CASE YOU CHOOSE, TOGETHER WITH ITS mechanism, should be certified free of emissions by the Federal Communications Commission (FCC). To be sold legally in the U.S., computer equipment must be certified by a testing laboratory; the equipment must not exceed FCC standards for radio-frequency emissions. Drives should have a label on them stating their compliance. If emissions exceed FCC standards, the equipment may disrupt phones, radio transmissions, and other communications services. There are two classes of FCC certification: Class A for business use and Class B for home use; devices certified for home use are automatically certified for business use, where the emissions standards are less strict. Of the drives we tested, only Core International's Optima External HD series and Storage Dimensions' MacinStor series were not certified for home use. DynaTek had submitted paperwork to the FCC and is awaiting verification of Class B certification for their drives.

Peace and Quiet

DRIVE NOISE IS A RELATIVE ISSUE, DEPENDENT ON the ambient sound in the work environment and on an individual's tolerance level. What's quiet to me may be clamorous to you. If the most discordant event in your day is the sound of the moths in your coat closet, consider noise when you choose a hard drive. On the other hand, if your office is anything like mine, you probably won't notice any difference from drive to drive.

In Macworld Lab's noise tests, we found 18 decibels to be unnoticeable background noise. By 35dB, sounds were audible in the work environment. At 47dB, sounds were loud enough to annoy and distract. The quietest drive we tested was Mass Microsystems' DiamondDrive 510, with a whisper-like rating of 31.7dB. The loudest drives were the CMS Platinum 400 and the Core Optima 200MB External HD, both of which ran at nearly 50dB. In general, we did not find a direct correlation between a drive's noise level and the type of mechanism it used—meaning that case design and components such as fans affect noise levels more than the mechanism does.

Chain of Command

EVERY DRIVE IN A CHAIN OF CONNECTED SCSI devices must have a unique identification number, or *address*, from 0 to 6 (if the Mac has an internal hard drive, that drive is automatically assigned ID 0). Somewhere on every hard drive is a selector switch for setting the SCSI ID number. Most formatting software helps you identify which SCSI ID numbers are in use, and more important, which are available for assignment.

SCSI selectors can be dials, push buttons, or banks of tiny DIP switches (which set the SCSI ID based on their on or off position). Most manufacturers put the SCSI selector at the back of the drive, next to the power switch, where, if you're not careful, fumbling fingers can inadvertently change the ID number when turning the drive on or off. The best SCSI selectors are those with tabs that enable you to physically lock in the SCSI ID. Liberty uses a locking push button and Procom uses a locking dial. The most annoying method of SCSI selection (used by La Cie and the MindFlight HardPac 240) are DIP switches, because you have to refer to the drive manual each time you want to set the ID. A small sticker on the back of the drive diagraming the various switch settings would help. Nonetheless, unless you add and remove SCSI devices often, the convenience of the SCSI selector is a minor consideration.

Termination Issues

IN ADDITION TO HAVING ITS SCSI ADDRESSES IN order, the Mac requires that the SCSI chain terminate so that signals flow correctly through the cables. At one end of the chain, the internal drive is already terminated, but you must also terminate the last device on the chain—be it a hard drive, a scanner, a removable-cartridge drive, or a CD ROM player. Externally terminated devices use either a physical terminator—a plastic device that plugs into one of the SCSI ports on the back of a drive—or DIP switches. Internally terminated drives use resistors on the inside of the box. Some vendors let you order a drive with either internal or external termination.

Internally terminated drives can be inconvenient, since the only way to unterminate them is to open the case and reset a jumper or pull the terminating resistors. However, if you always keep that drive at the end of the SCSI chain—and attach no other internally terminated device—you should have no problem. Internally terminated drives include those from ETC Peripherals, Hard Drives International, MacLand, Saturae. Drives from Mass Microsystems and Liberty use an excellent scheme called *active termination*, in which the drive's circuitry detects its position on the chain and automatically terminates the drive accordingly. If you change SCSI-device positions frequently, this capability is invaluable.

Similarly, La Cie, MindFlight, and PLI provide switchable termination. Instead of fooling with a small plastic terminator, you simply flip a switch on the drive's case to turn termination on or off. Switchable termination isn't as invisible as automatic termination, but it does give you more control in cases where a drive does not follow termination rules. For instance, every so often a drive at the end of the SCSI chain, say, does not work correctly even if it has a terminator—you may be forced to remove termination in order to get the drive to work, even though normally the drive should be terminated.

Often the hard drive's manual is akin to a toaster's manual

Most of the time, the manual that comes with the hard drive is akin to the one that came with your toaster—you look at it once and then tuck it safely away. But on those rare occasions when you do need information on the drive, you want the manual to be clear and accessible. For instance, Relax drives come with excellent documentation, with plenty of diagrams and pictures; and the manual that accompanies the complete version of FWB's Hard Disk ToolKit offers more information than you're likely to ever need.

Two of the fastest drives we tested were the MicroNet SS-540NP, (left), which uses a Maxtor mechanism, and the Saturae ProLine (right), which uses a Fujitsu mechanism. Both are high-capacity drives —500MB or more.

Software

ONCE IDENTIFIED AND PROPERLY TERMINATED, A drive must still be formatted, which is a function of software. Formatting entails laying down tracks and sectors where data will be written, and then verifying this structure. Basic verification determines any physical errors in the hard drive's media. The drive

HARD DRIVE SPECIFICS

Company	Product Line	Toll-Free Telephone Number	Regular Telephone Number	200MB–300MB Drives (Capacity/ Mechanism/Price)	300MB–500MB Drives (Capacity/ Mechanism/Price)	500MB–550MB Drives (Capacity/ Mechanism/Price)
APS Technologies	APS	800/235-2752	816/478-8300	213/M/$569; 240/Q/$669	340/M/$769	520/F/$1149, 535/M/$1079
CMS Enhancements	Platinum Drive		714/222-6000	200/C/$1359	400/S/$2439	
Core International	Optima External HD	800/688-9910	407/997-6055	200/Co/$1429		
DynaTek Automation Systems	DynaTek Hard Drive		416/636-3000	210/F/$1190 230/HP/$1295	330/F/$2190; 425/F/$2290	520/F/$2390
ETC Peripherals	ETC DataDrive	800/876-4382	813/884-2863	240/M/$659	425/F/$1029; 425/Q/$959	520/F/$1099; 525/Q/$1199
FWB	PocketHammer FMF		415/474-8055	200/D/$1539		
	PocketHammer			240/Q/$1439		
	hammer 525FMF					525/M/$2799
	hammer 525					525/S/$2599
GCC Technologies	UltraDrive S	800/422-7777	617/275-5800	240/S/$1039	420/S/$1699	
Generation Systems	Generation Systems	800/325-5811	612/633-5222	240/Q/$939	425/Q/$1419	
Hard Drives International (HDI)	PowerDrive	800/488-0001	602/350-1128	245/S/$649	340/M/$799; 425/F/$989	520/F/$1109
La Cie	Cirrus	800/999-0143	503/520-9000	240/Q/$769	400/Q/$1069	525/Q/$1289
	Tsunami			240/Q/$799	400/Q/$1099	525/Q/$1319
	ZFP			240/Q/$749	400/Q/$1049	525/Q/$1269
Liberty Systems	Liberty 50 Series		408/983-1127	210/C/$1099; 240/Q/$1199		520/S/$1899
	Liberty 70 Series				340/M/$1399; 425/Q/$1599	
Loviél Computer Corporation	Loviél	800/688-3696	612/828-6880	209/C/$959; 238/S/$1219; 240/Q/$1239	300/F/$1659; 400/F/$1769	500/F/$1879; 500/Q/$1979
MacDirect	MacDirect	800/621-8467	612/832-5706	212/C/$548		520/F/$1148; 540/C/$1148
MacLand	MacLand	800/888-8779		240/Q/$679	425/Q/$999	
MacProducts USA	Magic	800/622-3475	512/472-8881	240/Q/$699; 240/S/$799	425/Q/$1099	520/F/$1199
MacWarehouse	PowerUser Pro	800/255-6227	908/367-0440	210/M/$749	425/Q/$1499	
Mass Microsystems	DiamondDrive	800/522-7979	408/522-1200	210/M/$1079	320/M/$1755	510/M/$2089
Megadrive Systems	Megadrive HD Module	800/322-4744	310/247-0006		340/S/$1825	
	Mercury Millennium			240/S/$899	340/S/$1625	525/S/$1800
MicroNet Technology	MicroNet CPK-240		714/837-6033	240/S/$1295		
	MicroNet SS-540NP					540/M/$2595
Microtech International	Nova	800/626-4276	203/468-6223			500/F/$3099
MindFlight Technology	HardPac	800/263-3888	604/434-6463	240/Q,S/$1470		
Mirror Technologies	Mirror	800/654-5294	612/633-4450	240/Q/$699	425/Q/$1099	
Optima Technology	MiniPak		714/476-0515	200/S/$695	310/S/$895	500/M/$1095
PLI	PL series	800/288-8754	510/657-2211	240/Q/$1199	330/F/$1699; 425/F/$1899	520/F/$2199
Procom Technology	Procom MD Series		714/852-1000	240/S/$1325	320/S/$1995; 420/S/$2295	
Relax Technology	Relax Vista		510/471-6112	240/S/$619	310/HP/$1049; 425/F/$999	510/S/$1199; 520/F/$1199
Saturae	Academy	800/728-8723	617/661-8166	240/Q/$699		
	ProLine			220/HP/$849	402/HP/$1099	500/F/$1139
Storage Dimensions	MacinStor		408/954-0710	200/M/$1414	325/M/$2184	500/S/$2599
Third Wave Computing	Third Wave x	800/880-7555	512/832-8282	240/Q/$749		520/F/$1249
Total Peripherals	Total Peripherals Externals		508/393-1777	240/Q/$875; 240/S/$799	425/Q/$1199	
Tulin Technology	A-Hive Jr.		408/432-9057	200/C/$569; 213/M/$569; 240/Q/$669	340/M/$769; 425/Q/$959	520/C,F/$1099

● = *yes;* ○ = *no.* C = *Conner Peripherals,* Co = *Core International,* D = *DEC,* F = *Fujitsu,* HP = *Hewlett-Packard,* M = *Maxtor,* Q = *Quantum Corporation,* S = *Seagate Technology.* *Technical-support ratings are based on a series of calls made to each company by* Macworld *staffers (posing as customers) to gauge the accessibility, helpfulness, and accuracy of the company's support technicians.* Macworld *uses a point system, including bonuses and demerits, to derive the final rating. Ratings are for companies, not individual products, and we call only those companies whose products Macworld Lab tests.*

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Method of Sale	Termination	FCC Class	Data Recovery on Request	Warranty (in years)	Extended Warranty Available	On-Line Tech Support	Toll-Free Tech Support	Technical Support Rating
direct	external	B	for a fee	2–5 *	○	●	●	excellent
dealer	external	B	○	1	●	●	●	very good
dealer	external	A	for a fee	5	○	●	○	very good
dealer	external	pending	for a fee	5	○	○	○	very good
direct/dealer	internal	B	for a fee	5 †	●	●	●	excellent
dealer	external	B	free	2	●	●	○	excellent
dealer	external	B	free	2	●	●	○	
dealer	external	B	free	2	●	●	○	
dealer	external	B	free	2	●	●	○	
direct/dealer	external	B	free	2	●	●	●	very good
dealer	external	B	for a fee	1	○	●	○	excellent
direct	internal	B	○	1	●	○	●	unsatisfactory
direct	switchable	B	for a fee	2	●	○	●	excellent
direct	switchable	B	for a fee	2	●	○	●	
direct	switchable	B	for a fee	2	●	○	●	
direct	automatic	B	for a fee	1	●	●	○	excellent
direct	automatic	B	for a fee	1	●	●	○	
dealer	external	B	free	1–5 *	●	●	●	very good
direct	either	B	free	2–5 *	○	●	○	very good
direct/dealer	internal	B	for a fee	2	○	○	●	very good
direct/dealer	either	B	free	2	●	●	○	very good
direct	external	B	○	2	○	●	●	very good
dealer	active	B	for a fee	2	●	●	●	excellent
dealer	external	B	free	1	●	●	●	excellent
dealer	external		free	1	●	●	●	
dealer	external	B	○	1	●	●	○	excellent
dealer	external	B	○	2	●	●	○	
dealer	external	B	free	5	○	●	●	excellent
dealer	switchable	B	for a fee	1	○	○	●	very good
direct	external	B	for a fee	2	●	●	○	excellent
dealer	external	B	free	1	●	●	○	very good
dealer	switchable	B	free	2–5 *	●	●	●	excellent
dealer	external	B	for a fee	1	●	●	○	very good
direct/dealer	external	B	for a fee	1–5 *	○	○	○	excellent
direct	internal	B	free ††	2	○	●	●	excellent
direct	external	B	free ††	5	○	●	●	
dealer	external	A	○	2	●	●	●	very good
direct	external	B	free	2–5 #	○	●	●	excellent
dealer	either	B	free	2	● §	○	○	good
direct	external	B	free ‖	2	●	○	○	poor

** Varies depending on the mechanism. † Mechanism is warranted for 5 years; case for 1. †† The company does not guarantee this service. § This feature is a dealer option. ‖ The first half hour of labor is free. # Length of warranty varies depending on mechanism and/or price.*

then creates a map to show the CPU where each tiny data mine is so that the drive won't write data to that location. Some formatting software performs as many as four verifications, each more accurate and more time-consuming than the previous. All the tested drives include basic formatting software.

Most drives run at the same speed, give or take a few seconds

The best formatting software enables you to partition the hard drive, dividing it into separate volumes that appear on the Mac's desktop like separate hard drives. Partitioning drives as large as these midsize drives saves access time by limiting the physical area the drive's read-write head has to search for data. Think of a pizza. If you want to remove the anchovies, it's a lot easier if they're all on one or two slices instead of on the whole pizza.

Partitioning also lets you share volumes among coworkers. Formatting software can enable you to optionally password-protect, and even encrypt, volumes you don't want to share with others. Finally, if you partition a drive you can install a different operating system, such as A/UX or DOS (this is helpful if you're in a multiplatform environment and need to share data).

FWB's Hard Disk ToolKit, included with all FWB drives, augments the basic formatter with a suite of utilities for a variety of hard drive functions. HDT Primer, the formatter, is the most intuitive of those we tested, the easiest to use, and offers the most formatting options. Some vendors such as MacDirect, Third Wave, and MacProducts ship their drives with a Personal Edition version of Hard Disk ToolKit, which provides just the basics that most users need. ETC Tools, which ships with the ETC drives, and SCSI Director Lite, which comes with Loviél products, are also easy to use but perform only one-pass verification. Some vendors, such as Storage Dimensions and Microtech, also include a hard drive utility/recovery program such as Mac Tools and Norton Utilities.

Finally, some vendors toss in a collection of shareware programs as a freebie. The APS, La Cie, PLI, and MacProducts drives all came with more than 10MB of shareware. This can be a nice little bonus, though you've got to sift through it to find what's valuable to you.

Ten Tips for Keeping Your Hard Drive Healthy

Your hard drive stores all your valuable data, so you should learn to treat it with the respect it deserves. (And you should always remember to back up your data.) Drive Savers (415/883-4232), a hard drive repair facility in California, offers these tips to its customers for keeping a hard drive operating smoothly.

1. Turn on your drives first. Once they are up to speed, then turn on your Macintosh.
2. Turn off your Macintosh first, then turn off the drive. Always quit each application and perform a shutdown using the Special menu.
3. Do not turn the drive on and off many times in succession. Allow about one minute for the System to completely shut down before turning it back on.
4. Never move or jar the drive while it is operating.
5. When transporting the drive, prevent jostling it by using a padded container or the original packaging.
6. Allow adequate space around the system's cooling vents. Remove books, papers, or anything that might block airflow.
7. Do not place the drive on carpeting; the static electricity found in carpeting can cause data corruption.
8. Do not place the drive on top of or directly next to the monitor; electromagnetic radiation will interfere with the drive and may corrupt your data.
9. All computer equipment should be plugged into surge protectors or line conditioners since "dirty" power from your utility company can contain spikes of current that damage equipment.
10. Avoid rapid temperature changes. Allow your drive to warm up to room temperature before operating it if the drive was previously in a very cold environment.

Help On Call

TO TEST THE VENDORS' TECHNICAL SUPPORT, WE called each drive maker to ask for help with a set of hard drive ailments. Numerous companies provided excellent technical support—we waited on hold no more than five minutes, if at all, and we talked to friendly technicians who knowledgeably answered all our questions. Some companies fell down on the job, however, either because we could never get through on the line, our messages were not returned, or the technicians were unable to diagnose the hard drive problems. Hard Drives International and Tulin were the worst offenders (for further details on how companies fared, see "Hard Drive Specifics").

Most companies offer warranties for one, two, or five years, depending on the mechanism's manufacturer. A few, such as Core International, DynaTek Automation Systems, and Microtech, offer five-year warranties on all their products no matter what the mechanism. Many vendors sell extended warranties. Some companies also offer a money-back warranty if you're simply not satisfied.

Speed and Capacity

WHEN ALL IS SAID AND DONE, WHEN YOU BUY A hard drive you're looking for additional storage space for your applications and data, and quick access to that data when you need it. Most drives run at about

Hard Drive Speed Tests
200MB to 520MB

Color Key

- Fastest
- Percent slower than fastest
  - Up to10%
  - 11%–20%
  - 21%–29%
  - 30% or more

The drives are listed from best overall performance to worst. To determine rankings, we indexed overall performance numbers against the fastest drive. Index numbers are to the left of product names.

We measured each drive's ability to duplicate a 3.2MB folder of files as well as a 3.2MB file. We also measured each drive's ability to open files, save files, search a 4th Dimension database, and compile code in Think C. We then used SCSI Evaluator to test how fast each drive could read and write data.

In the noise tests, the lower the decibel level, the quieter the drive. We found that drives with decibel levels in the upper 40s were noisy enough to be irritating in our office environment.

Mechanism codes are in parentheses following product names.
C = Conner Peripherals, Co = Core International, D = DEC, F = Fujitsu, HP = Hewlett-Packard, M = Maxtor, Q = Quantum Corporation, S = Seagate Technology

Overall Fastest		Duplicate (in seconds)	Open (in seconds)	Save (in seconds)	Search (in seconds)	Compile (in seconds)	SCSI Evaluator Read (in MBps)	SCSI Evaluator Write (in MBps)	Sound (in decibels)
1.00	MicroNet SS-540NP (M)	27.15	31.86	21.39	34.48	21.38	2.463	2.356	39.8
0.99	FWB hammer 525FMF (M)	27.13	32.89	21.77	34.75	21.46	2.489	2.353	39.5
0.92	Saturae ProLine 500MB (F)	29.06	34.12	27.36	27.33	24.37	2.078	2.167	40.4
0.91	APS 240MB (Q)	28.80	37.95	27.78	26.51	24.93	2.043	2.193	46.5
0.91	La Cie Cirrus 240MB (Q)	31.60	37.59	26.96	26.95	24.90	2.111	2.212	38.0
0.90	FWB hammer 525 (S)	30.69	34.62	24.36	34.36	24.53	2.349	2.037	33.6
0.90	Loviél 500MB (F)	30.57	35.42	29.81	25.80	24.96	2.061	2.020	38.7
0.89	Relax Vista 510MB (S)	31.25	35.00	24.88	34.52	25.68	2.374	2.029	42.4
0.89	MacProducts Magic 240MB (Q)	28.60	37.05	26.41	34.51	24.96	2.003	2.226	37.2
0.89	PLI PL330 (F)	30.30	35.63	30.97	25.90	25.34	2.028	2.010	36.7
0.89	PLI PL240 (Q)	29.14	37.77	26.62	34.61	25.15	2.091	2.235	35.0
0.89	MacDirect 520MB (F)	30.28	37.44	31.09	25.89	24.46	2.062	2.020	37.4
0.89	Loviél 300MB (F)	30.55	36.32	30.46	25.92	25.25	2.020	2.010	38.8
0.89	Saturae Academy 240MB (Q)	28.41	37.68	26.87	34.66	24.93	2.026	2.223	35.1
0.89	La Cie ZFP 240MB (Q)	28.60	39.04	26.45	26.52	24.75	1.770	1.961	35.1
0.89	GCC UltraDrive 420S (S)	32.74	35.51	30.66	28.08	25.28	2.252	2.030	40.2
0.89	Optima MiniPak 310MB (S)	32.90	34.91	30.70	28.23	25.62	2.270	2.021	38.0
0.88	Procom MD420 (S)	33.50	35.74	30.53	28.18	25.40	2.280	2.017	33.2
0.88	MacLand 240MB (Q)	29.37	37.91	26.67	34.48	25.18	2.010	2.231	33.8
0.88	FWB PocketHammer 240MB (Q)	28.73	39.12	28.12	34.97	25.12	2.117	2.262	35.2
0.88	DynaTek 520MB Hard Drive (F)	30.31	36.07	30.31	25.98	25.21	2.086	1.752	37.5
0.87	HDI PowerDrive 520MB (F)	30.33	34.52	28.03	34.63	24.25	2.074	2.018	39.9
0.87	Third Wave X 240MB (Q)	29.37	38.93	27.29	34.89	25.21	2.030	2.226	38.7
0.87	Generation Systems 240MB (Q)	31.35	36.76	30.86	25.89	25.84	2.103	1.794	43.1
0.86	Saturae ProLine 402MB (HP)	29.34	37.51	30.99	28.69	25.43	1.759	2.041	33.5
0.86	MacProducts Magic 425MB (Q)	29.12	36.27	29.52	30.53	24.90	1.855	1.857	36.2
0.86	Mirror 240MB (Q)	31.51	37.47	30.96	25.91	26.75	2.085	1.807	41.9
0.86	Third Wave X 520MB (F)	30.45	36.35	30.10	34.63	24.84	2.060	2.020	40.3
0.86	La Cie Tsunami 240MB (Q)	32.06	37.89	28.32	34.74	27.15	2.072	2.199	32.5
0.86	PLI PL425 (F)	31.15	35.44	29.68	34.51	25.12	2.055	2.022	35.1
0.85	Liberty 70 425MB (Q)	30.06	36.97	29.15	30.37	25.12	1.857	1.859	40.2
0.85	Loviél 400MB (F)	30.79	35.18	29.47	34.46	26.21	2.039	2.012	40.0
0.85	ETC 425/520MB (F)	30.03	35.64	30.23	34.43	25.09	2.073	1.893	37.3
0.85	Megadrive HD Module 340MB (S)	32.72	36.26	31.16	34.57	25.39	2.232	1.970	41.2
0.85	APS 520MB (F)	30.81	36.72	30.46	34.47	25.56	2.061	2.020	42.1
0.85	MacProducts Magic 520MB (F)	30.26	37.66	30.56	34.84	24.90	2.062	2.018	36.7
0.85	HDI PowerDrive 425MB (F)	30.94	37.00	30.86	34.97	24.75	2.056	2.014	38.9
0.85	Mirror 425MB (Q)	28.80	36.95	29.08	30.73	25.18	1.872	1.627	42.7
0.85	PLI PL520 (F)	30.36	38.12	30.90	34.78	25.06	2.076	2.018	37.1
0.84	La Cie Cirrus 400MB (Q)	29.90	37.36	30.23	31.28	25.68	1.869	1.866	34.4
0.84	MacDirect 540MB (C)	32.56	34.43	28.21	25.47	24.00	1.538	1.541	36.1
0.84	ETC 425MB (F)	31.44	37.39	30.59	35.01	25.06	2.045	2.025	43.8
0.84	Procom MD 320MB (S)	32.75	37.92	32.06	34.92	25.90	2.282	2.021	34.8
0.84	Relax Vista 520MB (F)	31.05	38.34	31.01	34.90	25.25	2.076	2.030	43.1
0.84	Relax Vista 425MB (F)	31.58	37.79	31.54	34.86	25.75	2.063	2.018	40.9
0.83	Generation Systems 425MB (Q)	29.10	36.72	29.58	34.47	25.60	1.873	1.629	41.2
0.82	MacWarehouse PowerUser Pro 425MB (Q)	29.82	39.06	31.45	34.89	25.62	1.866	1.865	41.4
0.82	Microtech Nova 500MB (F)	30.86	37.76	31.55	34.89	25.50	2.060	1.743	42.5
0.82	La Cie ZFP 400MB (Q)	29.86	38.90	31.98	35.02	25.78	1.876	1.876	34.4
0.82	Saturae ProLine 220MB (HP)	29.58	40.06	33.41	34.99	25.81	1.753	2.051	37.7
0.82	APS 535MB (M)	32.84	37.91	30.90	34.54	27.84	1.927	1.935	44.1
0.81	FWB PocketHammer 200FMF (D)	37.15	39.09	28.33	34.36	24.80	2.491	1.369	40.4
0.80	Optima MiniPak 500MB (M)	33.51	39.81	31.61	35.07	27.59	1.942	1.954	36.9
0.80	CMS Platinum Drive 400MB (S)	35.49	40.58	28.70	31.36	25.93	1.785	1.687	49.6
0.79	Liberty 70 340MB (M)	34.53	39.04	32.96	33.21	29.84	1.836	1.840	38.3
0.79	Storage Dimensions MacinStor 325MB (M)	34.69	38.93	33.48	34.48	29.34	1.853	1.864	40.8
0.78	HDI PowerDrive 340MB (M)	34.76	38.75	33.82	34.57	29.21	1.841	1.861	34.8
0.78	APS 340MB (M)	34.91	39.45	34.12	34.78	29.43	1.839	1.844	46.2
0.78	Tulin A-Hive Jr. 240MB (Q)	34.92	40.56	31.48	26.18	24.68	2.082	0.787	37.5
0.78	Relax Vista 310MB (HP)	34.40	38.36	34.18	34.48	27.71	1.742	1.746	44.9

continues

Hard Drive Speed Tests (continued)

200MB to 520MB

Color Key

- Fastest
- Percent slower than fastest
- Up to10%
- 11%–20%
- 21%–29%
- 30% or more

Mechanism codes are in parentheses following product names. C = Conner Peripherals, Co = Core International, D = DEC, F = Fujitsu, HP = Hewlett-Packard, M = Maxtor, Q = Quantum Corporation, S = Seagate Technology

		Duplicate (in seconds)	Open (in seconds)	Save (in seconds)	Search (in seconds)	Compile (in seconds)	SCSI Evaluator Read (in MBps)	SCSI Evaluator Write (in MBps)	Sound (in decibels)
0.78	Mass Microsystems DiamondDrive 510MB (M)	33.64	40.06	31.89	34.88	27.87	1.917	1.598	31.7
0.76	MacLand 425MB (Q)	29.27	35.99	30.28	30.73	24.71	1.113	0.998	36.3
0.75	Core Optima External HD 200MB (Co)	34.08	40.74	40.95	34.81	27.81	1.755	1.759	49.7
0.75	MacDirect 212MB (C)	33.26	36.56	33.01	26.12	25.75	1.369	0.852	35.1
0.74	Mass Microsystems DiamondDrive 320MB (M)	35.02	41.82	35.78	34.86	29.84	1.836	1.544	38.3
0.73	HDI PowerDrive 245MB (S)	36.73	38.79	36.10	31.91	27.50	1.285	1.581	40.4
0.73	MicroNet CPK-240 (S)	36.21	39.04	36.22	32.13	27.84	1.281	1.586	40.5
0.73	Loviél 238MB (S)	36.51	39.44	36.16	32.02	27.75	1.255	1.592	39.4
0.73	Liberty 50 520MB (S)	37.39	43.26	33.00	30.83	26.81	1.444	1.359	38.5
0.72	GCC UltraDrive 240S (S)	38.06	62.35	31.66	28.33	27.34	1.395	1.599	41.1
0.72	MacProducts Magic 240MB (S)	36.76	39.43	36.36	34.45	27.68	1.288	1.594	43.6
0.71	Optima MiniPak 310MB (S)	36.93	39.34	36.45	34.47	28.46	1.273	1.583	39.5
0.71	MacWarehouse PowerUser Pro 210MB (M)	35.99	41.68	40.70	34.47	30.18	1.489	1.507	43.2
0.71	Megadrive Mercury Millennium 240MB (S)	36.87	39.19	36.70	34.59	28.00	1.231	1.512	41.9
0.71	MindFlight HardPac 240MB (S)	36.32	40.99	37.40	34.98	26.65	1.261	1.498	40.0
0.71	Storage Dimensions MacinStor 200MB (M)	35.90	41.79	37.49	35.22	29.09	1.436	1.438	42.8
0.70	Mass Microsystems DiamondDrive 210MB (M)	37.69	41.43	40.10	29.54	28.12	1.371	1.200	38.9
0.70	Relax Vista 240MB (S)	37.10	41.31	38.09	35.30	28.31	1.280	1.591	42.2
0.66	APS 213MB (M)	37.47	45.52	43.87	35.05	30.68	1.353	1.353	45.5
0.63	Total Peripherals External 425MB (Q)	38.49	43.64	36.85	31.85	27.25	0.757	0.825	41.4
0.62	Total Peripherals External 240MB (Q)	38.70	43.28	35.38	34.79	27.12	0.748	0.844	40.8
0.57	Total Peripherals External 240MB (S)	43.57	47.70	42.21	34.86	29.40	0.676	0.804	45.8
0.57	CMS Platinum Drive 200MB (C)	47.34	51.78	52.58	35.56	31.46	1.105	0.974	42.5
Overall Slowest 0.57	Loviél 209MB (C)	42.73	50.08	47.73	34.93	30.37	0.821	0.817	35.5

the same speed, give or take a few seconds. But you do need to watch out for drives that are distinctly slower than the others. For instance, when duplicating a 3.2MB folder and a 3.2MB file, there was a difference of up to 16 seconds between the fastest drives and the slowest drives.

It's important to know the maximum rate at which your Mac can transfer data between the hard drive and the processor. This is known as the transfer speed or rate and normally yields separate numbers for reading and writing data. All the drives, except those with SCSI evaluator read or write times below 1MB per second, are faster than 68000-based Macs such as the Mac Plus and Classic II (see "Hard Drive Speed Tests"). These Macs can transfer only 1MB per second (based on their processor and SCSI speed) no matter how fast the hard drive. (Mac IIci's, in contrast, transfer about 2.2MB of data per second.) Some of the slower drives are inexpensive, but you can find others that perform better and cost about the same. With so many choices these days, there's no reason to buy a poky drive.

In general, the best-performing drives use higher-capacity, 500MB mechanisms. The two top drives, the MicroNet SS-540NP and the FWB hammer 525FMF, both use the Maxtor MXT-540SL mechanism. Next in line is the Saturae ProLine 500, which uses the Fujitsu M2624S-512 mechanism.

To see how using a higher-speed Mac affects these top-speed drives' performance, we tested them on a Quadra 950 (which has an average transfer rate of 4.8MB per second). The read tests for the FWB hammer 525FMF on the Quadra 950 had a 43 percent improvement over the same testing done on a Macintosh IIci. The MicroNet improved 112 percent on the write tests, yielding a transfer rate of 4.3MB per second compared with 2.3MB per second on the IIci.

The speedier performance of these drives is due in part to an increasingly popular trend in hard drive manufacturing, which is to build in a read cache, and sometimes to build in a write cache as well. The drive's cache operates similarly to a processor's RAM cache, holding data in RAM for instant access, rather than waiting for the drive platter to spin around to the spot where the read-write head can find it. The primary advantage of a hard drive cache is that it frees up the processor's memory to do what it does best—open large applications and files. FWB's Hard Disk ToolKit can configure any caching parameters, such as the size of the cache or whether the cache is turned on or off, that a mechanism supports.

In the case of the Maxtor mechanism found in the FWB hammer 525FMF and the MicroNet SS-540NP, the additional performance is also due to the speed of the platters, which spin at a blistering 6300 rpm (most drives spin at 3600 rpm). The faster rotation speed means that the drive head has to wait less time to access data. The faster speed also means that the Maxtor mechanism can have a larger-than-average cache (256K each of read and write cache

versus 64K of read cache only for most drives), since more data can be quickly read into the drive cache. Low-level transfer rates were substantially higher for the SS-540NP when we used the NuPort board. But our real-world tests (opening and saving files, searching a database, and so on) showed very little speed difference with or without the NuPort board. That's because in real-life situations, the system software adds overhead not found in low-level read and write tests. We also tested the MicroNet SS-540NP with MicroNet's NuPort SCSI accelerator board.

For drives sold through dealers, you'll pay less than list price

Real-World Tests

OUR SCSI-EVALUATION TESTS ONLY REFLECT transfer rates in a purely scientific manner. Much more telling are real-world tests, which give you an idea of how fast the drives deliver on real, day-to-day operations such as opening Photoshop files, copying folders from the external drive to the internal drive, or searching a large database. These tests also allow us to evaluate a drive's access time (the time it takes the data-searching drive head and the drive platter to find each other).

On each drive we duplicated a folder filled with 3.2MB of data and a single 3.2MB database file. In addition we searched a 4th Dimension database of 4370 records and opened and saved a 1.32MB Aldus PageMaker document and a 3.9MB Adobe Photoshop file. The final test was to compile a 17,517-line program, written in Symantec's Think C.

The duplication tests reliably indicate how the drive performs when asked to read data from and then immediately write back to the mechanism. Drives with Quantum 240S and 425S mechanisms took seven of the top ten slots in this category. Maxtor's MXT-540SL (in the FWB hammer 525FMF and the MicroNet SS-540NP) topped the category. Most of the other drives with Fujitsu mechanisms had a bigger showing in the middle of these tests.

For the file-saving and -opening tests, the MicroNet SS-540NP and the FWB hammer 525FMF placed at the top. These drives' high showing in save operations is due to the large write cache of the Maxtor MXT-540SL mechanism. Drives with Fujitsu, Seagate, and Conner mechanisms also did well on these tests.

Compiling requires a drive to locate source code (data) from different parts of the platters and combine it to form a coherent application. Thus a compile test measures a drive's ability to search, read, and then write. The Maxtor, Quantum, and Seagate mechanisms dominated the high end of this test.

The Bottom Line

YOUR PURCHASING DECISION SHOULD BE BASED principally on the mechanism and then price; after that, consider support, warranty, case design, and so on, to help you narrow the field. If you can afford the best, the top performers are the MicroNet SS-540NP, FWB hammer 525FMF, Saturae ProLine 500, and the APS 240. Among the portables, the Liberty drives are the top of the line in any capacity, and their prices are also tops.

When budget is a primary concern, the APS line offers the best deal. These drives are reasonably priced, have good speed and features, and the company offers solid technical support. For drives that are sold direct from the manufacturer, expect to pay close to the retail price. For drives that are sold through dealers, you can expect to pay less than list price. For instance, although drives from companies such as FWB, Microtech, and Storage Dimensions have high retail list prices, you can usually find these drives at dealers for 10 to 30 percent less.

One of the great things about doing this feature was finding out that there were no clear losers this time around. Most of the drives are fine choices, thanks to what seems to be the drive vendors' extra effort to put out a quality product. m

Macworld Lab testing supervised by TIM WARNER.

MW EDITORS' CHOICE

Best Bargain

APS Fujitsu 520 This drive has fast performance, a good price, and friendly, accessible technical support available through both an 800 number and a BBS service. **Company:** APS Technologies. **List price:** $1149.

Best Technology

DiamondDrive 510 This drive is speedy, quiet, and offers active termination. Quality design and good, toll-free technical support make this drive a great deal. **Company:** Mass Microsystems. **List price:** $2089.

Best All-Around Quality

hammer 525FMF This top-performing drive offers solid construction and excellent technical support. The FWB Hard Disk ToolKit is worth buying alone, and the drive's documentation is well done. **Company:** FWB. **List price:** $2799.

Best Lower-Capacity Drive

La Cie Cirrus 240 This drive has a well-designed case, switchable termination, and a good price. The technical support is excellent, and the company is owned by mechanism maker Quantum. **Company:** La Cie. **List price:** $769.

NEW FROM APPLE:

3 Printers AND 1 Scanner

by Steve Roth

WHEN APPLE INTRODUCED THE LASERWriter with Adobe's PostScript page-description language in 1985, it catapulted the company, almost by surprise, into the forefront of imaging technology. LaserWriter sales took off like a runaway horse, and it was several years before Apple could get a hand on the pommel and start riding that horse with aplomb.

Times have changed. A new crop of imaging products released in January shows that Apple is riding the imaging horse for all it's worth. From inexpensive ink-jets to a midrange color scanner to upmarket laser printers, Apple is delivering an impressive stable of hardware for a wide range of black-and-white, gray-scale, and color imaging needs, along with software to tie it all together.

What's in the Mix

THE SPATE OF NEW PRODUCTS OFFERS something for almost everyone, from the penny-shy student to the corporate MIS director to the professional designer.

- The StyleWriter II, at $359, offers higher speed for text, better quality, improved paper handling, and new GrayShare technology, providing improved gray output and the ability to share the printer with other users on a network (see "Printing with Style").

- Two new laser printers (the LaserWriter Pro 600 at $2099, and the LaserWriter Pro 630 at $2529) sport multiple paper trays, built-in support for TrueType, 64 fonts, FinePrint (Apple's edge-enhancement technology), plus a parallel

PHOTOGRAPHS BY LUIS DELGADO

Apple's New Crop Clockwise from bottom left, the LaserWriter Pro, Apple Color Printer, StyleWriter II, and Color OneScanner.

port and Hewlett-Packard PCL Level 4 language emulation for use with DOS machines. The 600 supports 300 dpi, and is upgradable to 600 dpi. The 630 adds 600-dpi resolution; internal and external SCSI ports for connecting hard drives; an EtherTalk port; and a new version of Apple's PhotoGrade gray-scale printing technology.

▪ The $2349 Apple Color Printer, Apple's first color printer since the venerable ImageWriter II, is a tabloid-size, 360-dpi ink-jet printer based on the Canon BJC-820 engine. That engine's CMYK cartridges allow for both color and sharp black output on the same page. Combined with GrayShare, the printer makes possible network printer sharing and provides output at a fine, 85-line screen. (*Screening* breaks a gray image into patterns of black dots that look gray when printed. Screen frequency refers to the fineness of the spot grid used in halftoning. A finer screen looks more photographic, but results in fewer shades of gray. See "Halftones Demystified," *Macworld*, February 1993). The Apple Color Printer works with ColorSynch, Apple's new system-level color-management software, to ensure predictable color prints (see "Managing Color," *Macworld*, January 1993). Unfortunately, the printer offers only mediocre speed, and its quality lags behind the nearest competitor's.

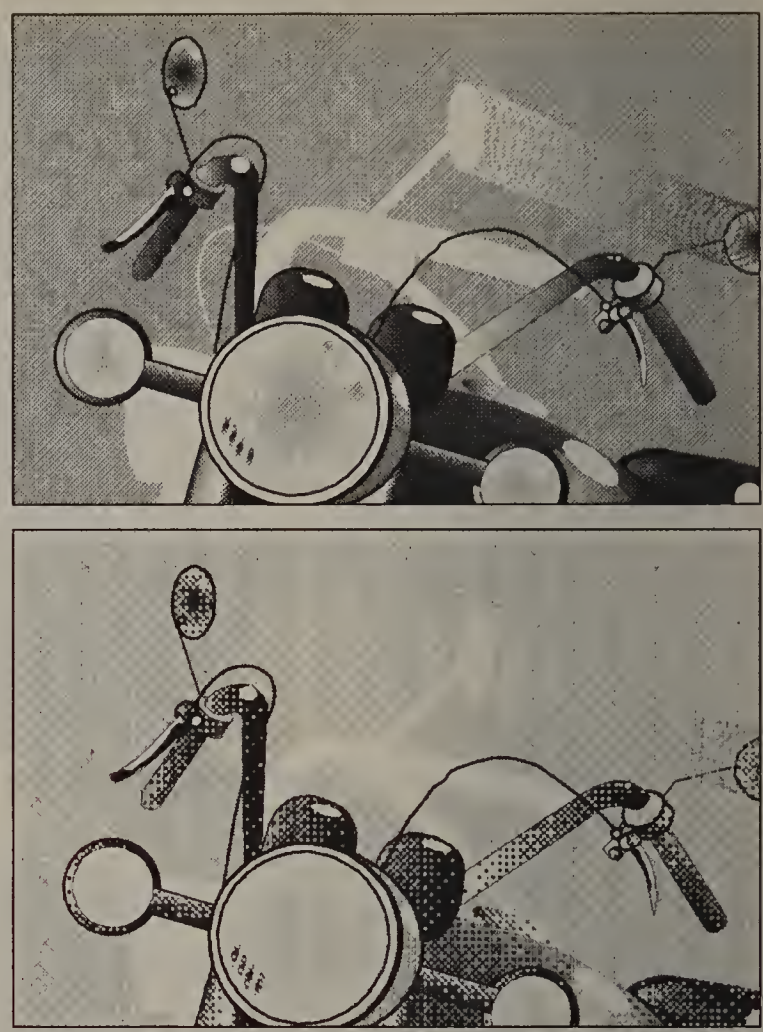
▪ The $1349 Color OneScanner package (which includes a color version of Ofoto) offers improved hardware for better dynamic range; superior sharpening tools; and compatibility with QuickTime for image compression and with ColorSynch for color correction.

It's All in the Software

WHILE THE NEW HARDWARE SPORTS impressive capabilities and good prices, the software makes these new offerings significant. The PostScript driver, QuickDraw drivers, and ColorSynch software are the linchpins that couple these new devices together into a truly useful imaging strategy. The software also adds significant capabilities to existing Apple products.

PostScript Driver Printer features aren't of much use if you can't control them when you're printing. And to control them, your Mac has to know what features are available. The new PostScript driver lets you query the printer from the Chooser to determine the printer's capabilities. The printer's feature options then appear in the Print dialog box. If you're printing on one of the two new LaserWriter Pros, for instance, you can set resolution, turn FinePrint and PhotoGrade on and off, and choose between paper bins for first and ensuing sheets.

The print-query feature doesn't work reliably with printers other than the LaserWriter Pros, however, at least for the time being. (It does allow control over the FinePrint and PhotoGrade resolution enhancement features in the LaserWriter IIf and IIg.) And it will never work with printers equipped with third-party envelope feeders and the like, because it works by querying the PostScript interpreter, and that interpreter doesn't recognize add-ons. As other PostScript printer manufacturers become aware of and support the new driver, however, and as Apple develops the driver to support other printers, we'll finally see the effortless access to printer features that the Macintosh-LocalTalk-PostScript combination has long promised, but has not yet fully delivered.



Stylish Grays Despite its inexpensive ink-jet technology, the StyleWriter II's gray-scale output (top) is remarkably good, if slow. It printed the FreeHand test document using true gray shades and halftoning, as opposed to the DeskWriter's 72-dpi patterns (bottom).

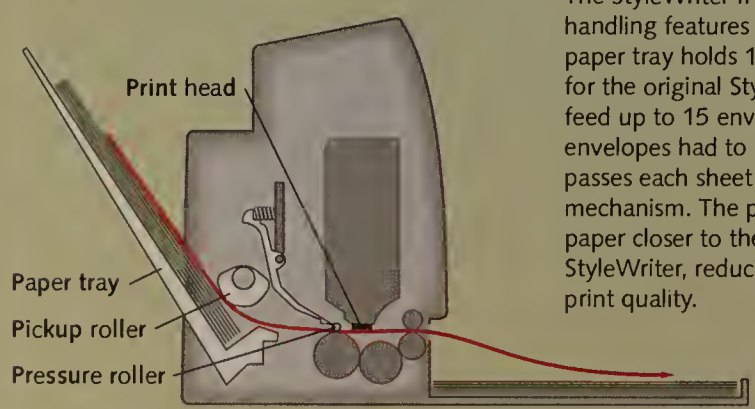
By the way, this new driver is *not* the long-awaited PostScript Level 2 driver from Adobe. That driver is due sometime in the first half of 1993.

QuickDraw Drivers QuickDraw printers—including the StyleWriter II and the Apple Color Printer—each have their own driver, but Apple has added capabilities that you can expect to see in other Apple QuickDraw printers in the future.

The first big improvement is GrayShare, which comprises two features that have nothing to do with each other except that they're both in the new QuickDraw drivers.

The *gray* part of GrayShare refers to the technology that provides more shades of gray at higher screen frequencies than can usually be attained at the relatively low resolutions of these QuickDraw devices—much like the PhotoGrade technology Apple uses in its laser printers. With the StyleWriter II, for instance, you can produce 33 shades of gray—equivalent to the output of a 300-dpi laser printer at default settings—at an impressive 106-lines-per-inch (lpi) screen frequency. The results from the StyleWriter are quite impressive. The unit approaches laser quality, though the 85-line output from the Apple Color Printer is disappointing compared to that of the Canon BJC-820.

StyleWriter II Paper Handling



The StyleWriter II improves on the paper-handling features of its predecessor. A single paper tray holds 100 sheets, compared with 50 for the original StyleWriter. The tray can also feed up to 15 envelopes; in the old StyleWriter, envelopes had to be hand-fed. The pickup roller passes each sheet or envelope into the printer mechanism. The pressure roller then delivers the paper closer to the print head than in the old StyleWriter, reducing ink splatter, which harms print quality.

The quick brown fox jump

The quick brown fox jump

StyleWriter's Edge on Type The StyleWriter II's 360-dpi resolution and redesigned print engine provide near-laser-quality type output (top), while a main competitor, the Hewlett-Packard DeskWriter, barely surpasses "near-letter-quality" dot matrix printing (bottom).

The gray-enhancement technology slows printing significantly (the FreeHand document took almost three times as long to print in gray-scale mode), but the StyleWriter's QuickDraw driver is smart enough to detect whether a page in a multipage print job includes grays, and turn the feature on and off appropriately from page to page.

The *share* part of GrayShare is even more significant. The new drivers let you share QuickDraw printers with other Macs on the network—publishing the printer so it appears in everyone else's Chooser. You can password-protect the shared printer, limiting which and how many network users can gain access to it. Printing to a published StyleWriter or Color Printer from a remote Mac is very fast, because the remote Mac has to send only concise QuickDraw information; the host Mac (the one with the printer attached) handles all the processing. The host Mac does suffer a performance hit from PrintMonitor's background processing, however.

Apple isn't making any promises, but you can expect to see the GrayShare enhancements—networking and improved grays—in upcoming versions of other Apple QuickDraw drivers, such as those for the Personal LaserWriter LS, the LaserWriter II SC, and the ImageWriter. The new StyleWriter driver should bring those features to the original StyleWriter as well, but it's left up to StyleWriter owners to lay hands on the driver however they can—a pretty shoddy practice on Apple's part, especially considering that Hewlett-Packard offers free or almost-free upgrades for its DeskWriter driver. Apple isn't currently offering an upgrade path, claiming that it hasn't tested a wide range of applications for compatibility. If and when Apple does make the new StyleWriter driver available, it will probably be a retail package.

The new QuickDraw drivers generally improve printer speed, though not in every case. For text, the StyleWriter II is about twice as fast as its predecessor, but for page layout and complex graphics, results were mixed. The old StyleWriter was slightly faster for printing an Aldus FreeHand document even in comparable black-and-white modes (see "StyleWriter II Performance"). The Apple Color Printer performed sluggishly on our tests, well below its main competitors from Canon and Hewlett-Packard (see "Color Printer Performance"). Although we used

Printing with Style

Apple's StyleWriter printer has been a popular item with cost-conscious customers since its introduction in early 1991, and its 360-dpi resolution has provided those customers with good quality for under $600. The printer has always taken a hard rap for its slow printing speed, however. The StyleWriter II, at $359, improves printing speed significantly and adds improved gray-scale printing, flexible paper handling, sharing over a network, and a larger font library.

The StyleWriter II is still behind the $599 Hewlett-Packard DeskWriter in speed, but not by much. On some documents in our tests (multifont Word, PageMaker), its output was close to 40 percent faster. On others, (FreeHand, MacDraw, and others including gray levels), it was much slower.

In return for that speed hit, however (which you can avoid by printing in black-and-white mode), the StyleWriter II achieves a level of gray-scale quality that many laser printers would be hard-pressed to achieve. Even FreeHand output has beautiful halftoned gray scales, compared to the crude, 72-dpi, MacPaint-like patterns that result on the DeskWriter.

The type output, while not quite on the laser printer level, far outclasses the DeskWriter, which still just surpasses near-letter-quality dot matrix output. While speed is a mixed bag when comparing these two printers, the StyleWriter II is the hands-down winner for print quality.

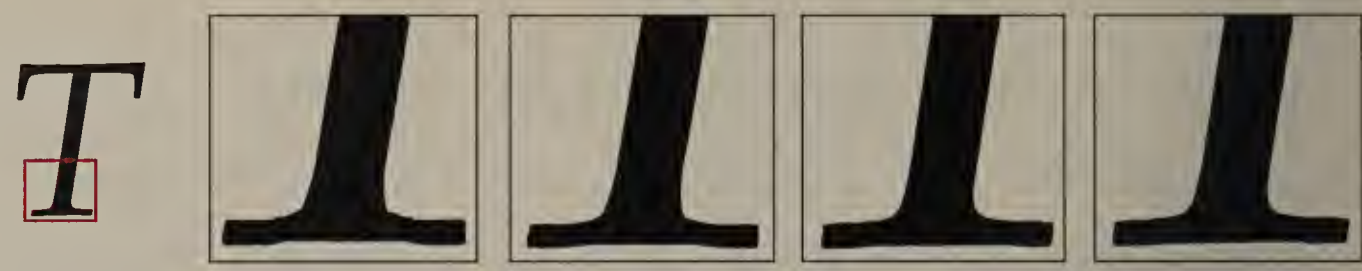
The StyleWriter II is smaller than its predecessor (and the DeskWriter), but nevertheless includes an expanded input tray and brings the power supply—formerly on the power cord—inside the case. The 100-sheet input bin handles letter- or legal-size paper and can autofeed up to 15 envelopes. The collapsible input and output trays make the printer more convenient in small work areas.

Apple's StyleWriter II The best ink-jet value on the market, featuring superb print quality.

The print engine itself has been improved, bringing the print head closer to the paper and moving the head in smaller increments. An expanded library of 39 TrueType fonts includes the standard 35 LaserWriter fonts, as well as Chicago, Monaco, Geneva, and New York.

Being able to network a printer that maxes out at around three pages per minute may not exactly be the top item on your wish list, but you can network it with the new driver (the DeskWriter has provided AppleTalk access since shortly after its introduction). The StyleWriter II now surpasses the DeskWriter for text, line art, and gray-scale output; both printers offer networking; and their speeds are comparable. Given the printers' price difference of more than $200, the new features and improved performance make the StyleWriter II the top choice among inexpensive ink-jet printers for the Mac.

a late beta version of the QuickDraw driver to test this unit, Apple doesn't expect performance to change with the final version of the driver.



LaserWriter Pro versus HP LaserJet 4M The LaserWriter Pro 630 doesn't match up to the HP LaserJet 4M on rendering subtle curves and slight angles. Notice the stairstepping (or *aliasing*) in the base of the *T* in the 300 dpi sample (far left). Even the 300-dpi HP sample (second from left) is as good as the 600-dpi LaserWriter Pro output (third from left). The 600-dpi HP output (right) is the hands-down winner.

ColorSynch Both the Apple Color Printer and the Color OneScanner derive a good deal of their prowess from ColorSynch, Apple's color-management system. ColorSynch makes color much more predictable than before; it provides a reasonably close correspondence between the colors of the original image, what you see on screen after scanning, and the colors that come out of your printer.

Apple Font Library The new laser printers come with the Apple Font Library of 64 typefaces in ROM—the familiar LaserWriter Plus set of 35, plus 4 Mac system fonts, and a library of 25 display faces from a variety of type foundries. The library is also available at retail for $99.

LaserWriter Pro 600 and 630

WHILE THE SOFTWARE IS THE MOST SIGnificant part of Apple's announcement, the company has also released a powerful load of new hardware—starting with the new LaserWriters.

The LaserWriter Pro 600 and LaserWriter Pro 630 are essentially the same printer. The only difference in hardware is that the 630 has 4MB of extra memory and SCSI and EtherTalk ports. The big news about these printers is really old news in the rest of the computer world: paper trays. The new paper-handling prowess is due to the Canon EX engine used in both printers, which also (along with the extra memory) provides the 600-dpi resolution of the 630.

The EX engine sports two input trays (100 and 250 sheets), allowing for first- and ensuing-sheet printing. There are also optional 500-sheet and 75-envelope feeders. Coupled with the new PostScript driver's ability to select paper bins, these paper-handling options bring a whole new level of office functionality to Apple's printer lineup.

If the new engine is anything like previous Canon engines (notably the LaserWriter's CX and LaserWriter II's SX engines), you can expect remarkably long life, very low maintenance, and low per-page costs.

The EX engine sticks with the single-cartridge-consumables strategy that's the signature of the Canon engine line. The EX uses a new type of cartridge, however, employing microfine toner, which allows for more gray levels and smoother lines. Quality is also enhanced by Apple's FinePrint technology, which smooths edges (reducing jaggies) when printing at 300 dpi. PhotoGrade-enhanced gray-scale output is improved on 630s and memory-upgraded 600s, providing 91 gray levels (compared to the IIg's 67) with a 106-lpi screen frequency at 300 dpi. This is perfectly adequate for many in-house and even professional publications that do not require top-notch photographic quality. PhotoGrade is not available at 600 dpi—where quality would be enhanced further—because of the memory that would be required.

FinePrint is not available at 600 dpi either, which puts the 630 at a disadvantage compared to the $2999 Hewlett-Packard LaserJet 4M's 600-dpi output with Resolution Enchancement Technology (RET). The 630's 300-dpi, FinePrint-enchanced type output is not nearly as good as the LaserJet's 300-dpi RET output. Even the 630's 600-dpi type (necessarily without FinePrint) is only marginally better than the 4M's 300-dpi type. The 4M's 600-dpi, RET output is the hands-down winner for type.

Gray-scale output is another story, however. The 630's PhotoGrade-enhanced output (only available at 300 dpi) provides a finer halftone screen and gray levels equivalent to the 4M printing at 600 dpi with RET. At 600 dpi, however, the 4M's RET offers slightly better gray shades with an equivalent screen.

You can simply add 4MB of memory (less than $150 as of this writing) to the 600 to get 600-dpi resolution and 300-dpi PhotoGrade, but you need a new logic

MW LAB StyleWriter II Performance

All times are in seconds. Shorter bars are better. The best performers in each category are highlighted in red. Products are listed in order of overall performance, from fastest to slowest.

Multiple Fonts Print speed in a typical multiple-font document, using a 7-page Microsoft Word 5.0 document containing a variety of fonts, sizes, and styles.

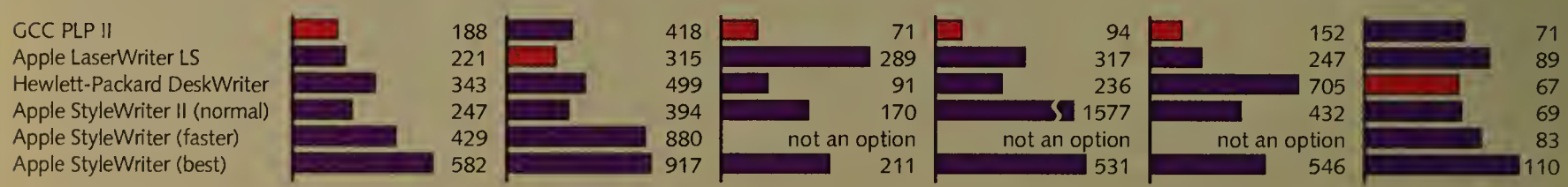
Courier Printer throughput, using a 2-page Microsoft Word 5.0 document containing double-spaced 12-point Courier text in plain, bold, and italic.

MacDraw Pro Print speed for complicated drawings that don't use many special effects. We used a graphic containing more than 2000 simple objects and several lines of Helvetica text.

FreeHand Print speed for complex graphics that include special PostScript effects. We used an illustration that includes nonlinear blends and Bézier curves.

PageMaker Print speed for a typical high-end desktop-publishing job. We used a 4-page newsletter using several fonts, a MacPaint image, and three gray-scale TIFF images.

TrueType Print speed for TrueType, using a 1-page Microsoft Word document containing 4 fonts.



Tests were conducted on a Mac IIci running System 7.1, with a cache card installed, 8MB of RAM, a Quantum Pro 80 internal hard drive, AppleTalk on, and background printing off if possible.

MW LAB LaserWriterPro Performance

All times are in seconds. Shorter bars are better. The best performers in each category are highlighted in red. Within each class, products are listed in order of overall performance, from fastest to slowest.

Multiple Fonts — Print speed in a typical multiple-font document, using a 7-page Microsoft Word 5.0 document containing a variety of fonts, sizes, and styles.

Courier — Printer throughput, using a 2-page Microsoft Word 5.0 document containing double-spaced 12-point Courier text in plain, bold, and italic.

MacDraw Pro — Print speed for complicated drawings that don't use many special effects. We used a graphic containing more than 2000 simple objects and several lines of Helvetica text.

FreeHand — Print speed for complex graphics that include special PostScript effects. We used an illustration that includes nonlinear blends and Bézier curves.

PageMaker — Print speed for a typical high-end desktop-publishing job. We used a 4-page newsletter using several fonts, a MacPaint image, and three gray-scale TIFF images.

TrueType — Print speed for TrueType, using a 1-page Microsoft Word document containing 4 fonts.

	Multiple Fonts	Courier	MacDraw Pro	FreeHand	PageMaker	TrueType
300-dpi resolution						
Compaq Pagemarq 20	65	91	162	235	88	66
Apple LaserWriter IIf	171	172	158	549	92	Couldn't print
Apple LaserWriter Pro 630	140	167	158	445	134	84
Apple LaserWriter IIg	157	172	157	454	137	92
Hewlett-Packard LaserJet 4M	175	172	170	401	134	136
600-dpi Resolution						
Compaq Pagemarq 20	72	91	163	320	102	73
Apple LaserWriter Pro 630	170	169	161	556	154	109
Hewlett-Packard LaserJet 4M	216	174	169	496	148	132

Tests were conducted on a Mac IIci running System 7.1, with a cache card installed, 8MB of RAM, a Quantum Pro 80 internal hard drive, AppleTalk on, and background printing off if possible.

board ($1799) if you also want the SCSI ports and EtherTalk.

The output speed of the LaserWriter Pros is impressive compared with that of the LaserJet 4M (with the exception of the PageMaker and FreeHand tests). But the new printers' speed is surprisingly about the same as that of their predecessors, the $3299 LaserWriter IIf and $4299 LaserWriter IIg (see "LaserWriter Pro Performance").

Like the CX and SX engines, the EX is limited to eight pages per minute, so you won't see big speed gains on long, simple documents, or when printing multiple, uncollated copies of a document.

Other benefits of the LaserWriter Pros include a parallel port for easier connection to DOS machines, and HP LaserJet compatibility (PCL 4). While the Pros boast an all-ports-active feature (so the printers can accept input from any of the ports without changes in switch settings or front-panel controls), they can't accept input from multiple ports simultaneously. A greater failing is the lack of automatic emulation sensing; the Pros can't detect the difference between PostScript and PCL print jobs. This greatly reduces flexibility in a mixed-network environment. You have to either run a utility on the Mac, download a snippet of PostScript code, or flip a switch.

The biggest omission from these printers is a feature that's only starting to become available from PostScript printer vendors (such as NEC and Compaq): direct fax capability. The ability to have a LaserWriter Pro send output to a remote fax would make these printers the hands-down choice among midrange PostScript printers.

As it stands, their paper handling, speed, quality-enhancement technology, Canon engine, and pretty good upgrade path for the 600 put the Pros near the front of the price/performance parade. The LaserJet 4M still has a definite edge in type quality, but it's significantly slower than the Pros. And with the LaserWriter Pro 600, you can start at 300 dpi for $600 less than the 4M, and move to 600 dpi inexpensively if you later require higher resolution.

Apple Color Printer versus Canon BJC-820 Though the Apple Color Printer and the Canon BJC-820 are based on the same print engine, the BJC-820 offers superior output (left). The Canon's diffusion dither provides better detail (note the clarity in the flowers and the sliced fig) and more subtle color gradations (as shown in the broader range of highlights and shadows) than does the Apple printer's with its more traditional halftoning approach.

Apple Color Printer

WITH THE NEW APPLE Color Printer, as with the LaserWriter Pros, paper handling is a major strength. The Color Printer handles up to tabloid-size sheets, either paper or transparency. Competitive printers with this ability are more expensive (the 300-dpi HP PaintJet XL300 at $3495, and the $2995 Canon BJC-820, which uses the same 360-dpi engine as the Apple Color Printer).

The main difference between the Color Printer and its Canon cousin (besides price) is in software. Both connect to the Mac via SCSI and

MW LAB Color Printer Performance

All times are in seconds. Shorter bars are better. The best performers in each category are highlighted in red. Products are listed in order of overall performance, from fastest to slowest.

MacDraw Pro — Print speed for a complex color MacDraw Pro document with more than 840 color objects, most of them gradient filled.

FreeHand — Print speed for complex graphics that include special PostScript effects. We used an illustration that includes non-linear blends and Bézier curves.

PowerPoint — Print speed for a transparency with a color gradient background and several lines of text in the Times font.

Photoshop — Print speed for a 910K, 72-dpi, 9.5-by-6.5-inch scanned image with many shadow details.

Tests were conducted on a Mac IIci running System 7.1, with a cache card installed, 8MB of RAM, a Quantum Pro 80 internal hard drive, AppleTalk on, and background printing off if possible. [1]QuickDraw version. [2]PostScript version.

The Apple Color Printer Apple's first entry into the color printer market is a bit of a disappointment, failing to beat the competition in speed and image quality.

handle image processing on the Mac, but the Apple printer has the printer sharing, background processing, and enhanced color range of Apple's GrayShare software. The Canon's output quality, however, is significantly better (see "Apple Color Printer versus Canon BJC-820").

When it comes to speed, the Apple Color Printer really falls flat. While it was comparable to the Canon on some test documents, on others (MacDraw Pro and FreeHand) it was dramatically slower (see "Color Printer Performance").

The Apple Color Printer's other software advantage is big—ColorSynch. The printer ships with a profile for ColorSynch, so you can expect much more predictable colors than from other printers. (Other printers will have profiles for use with ColorSynch soon, however—with most coming in the next six months—so ColorSynch compatibility will not be a distinguishing feature for long.)

The Apple Color Printer doesn't set any new standards, except perhaps in price. The Canon's higher speed and better quality make it a much better choice than the Apple Color Printer, even considering the $650 price difference.

Color OneScanner

APPLE'S GRAY-SCALE ONESCANNER CREated quite a stir when it was released, largely because of the intelligent, one-button scanning provided by its Ofoto software (developed by Light Source). The Color OneScanner with Ofoto 2.0 brings those capabilities, and more, to color scanning. Because the Color OneScanner software was not ready as we went to press, Macworld Lab was not able to verify quality or speed claims.

Apple's scanning hardware looks impressive. It employs a trilinear CCD array (a charge-coupled device, the unit that measures light values in an image), meaning there are three rows of CCDs, each with a separate color filter, allowing for one-pass color scanning. The scanner also includes a custom-designed lens and tuned color filters, which should help image clarity and color fidelity. The one-pass scanning is aided by an ASIC for color correction. And an adaptive analog-to-digital (A/D) converter should result in good *dynamic range.*

Dynamic range—the ability to distinguish subtle differences in gray levels in both shadow and highlight areas—is the key to capturing good data from a scanner. The Color OneScanner attempts to take advantage of the full dynamic range of its CCDs by adjusting the sensitivity of the A/D converter to match the range of values in the image.

Ofoto 2.0 takes advantage of the adaptive A/D converter, and adds several color-specific features. Ofoto automatically detects whether an image is color, gray scale, or line art, adjusts for print blur from a given output device (and even for slightly blurry photographs), and straightens and crops images. It uses ColorSynch to automatically adjust a scan to more closely match the original—both on screen and on output. There's automatic color-cast correction (for a photograph taken under fluorescent lights, for instance, that is excessively green), as well as support for QuickTime's image compression.

One thing still missing from Ofoto is explicit, manual control over the tone curve for images, à la Adobe Photoshop's Levels control. While the program's calibration methods suffice for many situations, there are many other situations where hands-on controls are essential. Current Apple OneScanner owners can upgrade to Ofoto version 2.0 for $75 by calling Light Source (800/231-7226). The upgrade provides better dynamic range and highlight/shadow control, improved sharpening, correction for print blur, and limited multitasking. (You can perform some tasks in Ofoto while other tasks continue in the background.)

The Apple Color OneScanner's biggest competitor is the $1995 HP ScanJet IIc. Though the IIc doesn't offer the automatic, one-step scanning of the Apple scanner, it does provide a similar calibration method and explicit control over the tone curve. The color version of Ofoto ($395) will also be available from Light Source for use with a variety of non-Apple scanners by early February.

Apple's imaging product line has come a long way since that first LaserWriter took off like a stampeding horse. The range of products in this latest release—a well-integrated, feature-rich combination of attractively priced hardware and software—shows that Apple has settled down from a dead run to a steady, comfortable lope—the kind of pace that will keep the company in the imaging race for a long time. m

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Contributing editor STEVE ROTH is coauthor of *Real World PostScript* (Addison-Wesley, 1988), *Real World PageMaker 4* (Bantam Computer Books, 1990), and editor of *Real World FreeHand* and *The QuarkXPress Book* (both from Peachpit Press, 1991).

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"I LEARNED MY FIRST SONG IN 7 MINUTES."

A Melodic Message From The Publisher...

Yes, it is a Miracle! Just sit down and learn how to play — progressing at your own speed, guided by the best software implementation I've ever seen. The Miracle's keyboard is secondary; it's the beautifully designed screens and carefully crafted lessons that have you pouring out the tunes in just minutes. It's a software masterpiece — and I've seen plenty of software!

The fact is, The Miracle is a brilliant teaching tool, highly visual and a lot of fun for aspiring musicians of any age — with The Miracle, it's never too late to learn.

If it sounds like I'm gushing all over about the Miracle — I apologize, but it's the most fun I've had with my computer in a while. Imagine sitting down — with no musical background at all — and playing "Chariots of Fire" or "Don't Be Cruel" in minutes! There's nothing like making music — it is one of the most wonderful accomplishments in the world.

...And The Miracle makes it happen. Here's how:

First, you enter the "Conservatory," where you enroll and begin with the basics: how to sit, how to hold your hands and the location of the notes. Each lesson teaches you a little bit more — simple melodies, names of notes and more. There are 40 chapters in all and you can't move to the next lesson until you've proven yourself on the current lesson. The computer knows exactly what you're playing at all times, charting your accuracy and adjusting the lessons to your level of progress.

During your lessons, you can click to "go to" the Arcade for some fun-and-games practice sessions. Learn to read music in the shooting range that knocks off ducks when you hit the right notes. You'll learn to play chords as parachutists jump out of a plane and learn melodies by repeating back what the Miracle plays. It's so much fun that you'll actually forget that you're learning. The next thing you know, you'll be playing your favorite songs.

Or, "go to" the Studio to record your own songs on an 8-track recorder (or play along with a symphony orchestra). The Studio provides over 120 instruments to choose from. It's the most amazing thing I've ever seen!

The Practice Room gives you a place to sharpen your skills or rehearse a particular tune until it's perfect, and the Performance Hall puts you on the stage for a formal concert. Go back to The Classroom to continue your musical education at your own pace.

It seems like everyone is talking about the Miracle Piano Teaching System. It's been featured on "Good Morning America," "The Today Show" and "The Arsenio Hall Show." It's been written about in Newsweek and The New York Times. It's become popular because it really works — anyone, at any age — can learn to play piano and achieve musical literacy in just a very short time. More importantly, they can learn at their own speed, without formal lessons — by connecting the Miracle to their Mac.

The Miracle Super System A Tiger Exclusive

If you love music, and always wanted to play the piano — here's you're chance. And it's never too late to learn with The Miracle, adults learn as quickly as children because they work at their own speed, building on skills quickly — on their own schedule. It's the power of your computer at work in an important role: learning.

TigerSoftware sweetens The Miracle's charms with a bundle that's simply unbeatable. You get the Miracle keyboard, software — plus the Miracle Song Collection so you can play along with your favorites from The Beatles, Michael Jackson, Buddy Holly, Lionel Richie, George Michael and more. We'll also include the Miracle Keyboard stand, stereo headphones and a copy of TRAX, the advanced MIDI recording software that transforms your computer into a multi-track recording studio.

MIRACLE SUPER SYSTEM

The Tiger Miracle Piano Super Bundle

Miracle Piano Teaching System	$599.00
Miracle Stand Shown Above	$35.00
Miracle Song Collection 1	$50.00
Miracle Song Collection 2	$50.00
Trax MIDI Studio Software	$100.00
Trax MIDI Song Collection	$50.00

Total Value $884 On Special For Only $389

BDT2877 **Miracle Piano MAC Super Bundle** **$389.00**
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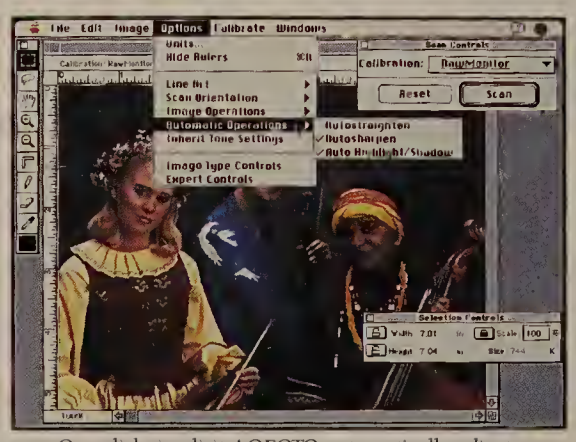
Improved One-Step Scanning!

Introducing New OFOTO Version 2

Ofoto Version 2 sets a new standard for accuracy and ease of use. Line drawings, art and images turn blocks of intimidating text into rich, visual landscapes, luring readers and directing them to the heart of the message. Now it's easy to create and print high-fidelity scans in color, grayscale, and black and white with the click of one button. Ofoto Version 2 goes beyond recreating the original photograph and gives users tools to correct images to the original *scene*, compensating for differences in film and paper and even conditions such as poor lighting and incorrect focusing. Users want to predict what they'll get from their desktop scanners with the same certainty they predict what they'll get from their service bureaus. Why struggle with endless corrections and adjustments to inferior scans when you can scan and print out just the image you want on the first try? At last there's a word for your thousand pictures: OFOTO, the expert operator for your desktop scanner.



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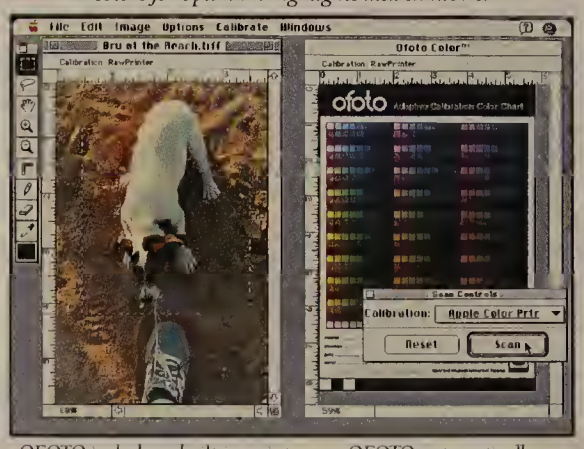

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Your Mac is a powerful educational tool — put it to work with the help of CD-ROM.

NEC CDR-25

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Connect And Control Modems, Printers, Networks, Peripherals And More!

One of the most useful new ideas in computing — Enables you to control — from a software interface — up to six serial devices. (Macs only come with 2 — Printer and Modem.) It's like adding six serial ports to your Mac (in fact, we found that it's almost like having TWO computers). Configure your equipment any way you like: One Mac to six devices; One Mac to five networks or four Macs to two devices. A snap to install, simple to operate and fully System 7 compatible — with a full two-year warranty on everything.

So forget changing cables, swimming through wires and fiddling with A-B switches (those things can actually cause system freeze-up!). Now you simply pop up the MultiPort screen, select the port you want to use from a graphical on-screen diagram — and you're done. Choose from six serial ports and five ADB ports — a total of eleven! The LED lights on the MultiPort unit indicate the port selected and your INIT installs setups for specific situations, each time the Mac is started. There are dozens of possibilities for the MultiPort, like using it "inside out" to allow up to 4 Macs to share two non-LocalTalk devices. You can even have more than one mouse connected to your Mac; your standard Mac mouse for normal use, and a trackball-type mouse for graphics and publishing work. Performs beautifully with all Mac add-on equipment.

MULTIPORT

BDT2785 **MultiPort MP-91** . . $189.90
Two Years Warranty On Everything.

MultiPorts. *Four serial ports located on the back of the enclosure can be characterized as either "Printer" or "Modem." connect up to six non-LocalTalk printers!*

System Ports. *Two more serial ports on the back are software defaults as startup and cannot be recharacterized. Always either "Printer" or "Modem."*

ADB Ports. *Four additional ADB ports and the connection for an optional ADB power supply are conveniently located on the side of the MP-91 enclosure.*

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The Lean And Mean Word Processor. WriteNow has swept the industry, collecting Editor's Choice awards and other top honors. Known for it's incredibly swift performance and compact size. But despite the lack of size, WriteNow contains a complete set of state-of-the-art features. Everything you need is here — with powerful new page design features (that you'll actually use) to create great looking letters, memos, reports, presentation handouts and more. The print quality is excellent.

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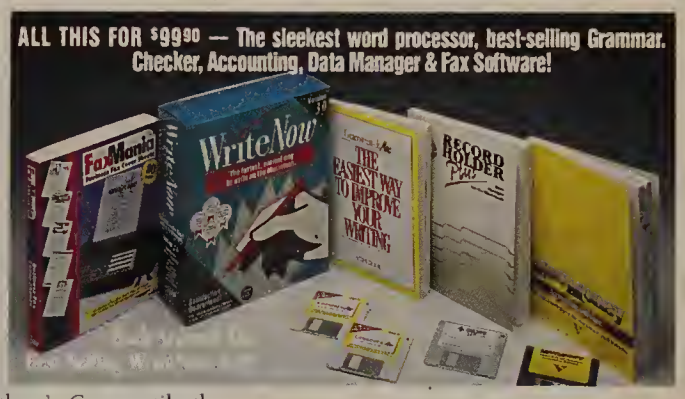

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BDT2966 **WriteNow 3.0 Competitive Upgrade "Hot-Pack" Bundle** . . . $99.90
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ALL-NEW SHARP OZ-9600 WIZARD!

Tiger is proud to be among the first in the world to premiere an amazing little device — the Sharp OZ-9600 Wizard. If you thought you knew what Wizards were all about, you ain't seen nothin' yet. First, the new Wizard is pen-based, so you can write notes, sketch maps — or draw cartoons! Just touch the pen on any of the graphical icons to open the calendar, use the new integrated Filer system, schedule appointments, do some quick calculations or look up a phone number.

This baby also features an extra-large display — five times larger than the OZ-8000 display! Plus — a new Touch Screen with pen-based, graphical interface. It's absolutely amazing — with 256K, built-in Calendar, To-Do List, Scheduler, Telephone Book, User File, Notebook, Calculator, Filer and more!

Expand The Sharp's Mind. Memory and applications simply slide in the touch-sensitive screen which acts as a keypad to perform tasks, open applications — and more.

SHARP WIZARD

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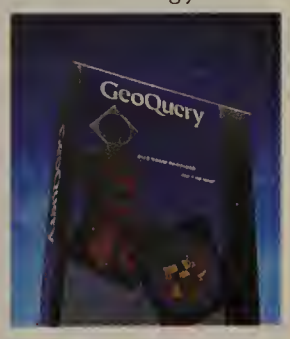
The Informative, Intuitive Mapping Software.

How many years have you been looking at your business in rows and columns? And realizing that it just isn't laid out that way? Twenty minutes with GeoQuery will change all that. Providing you with a new, and much better view.



GeoQuery instantly transforms your customer and prospect lists — or any business data — into interactive maps. It lets you do things that are impossible with your spreadsheet, database, or contact manager. Things like making that extra sales call you would otherwise miss, choosing the best location for a seminar or service center, assigning optimum sales territories, and making your presentations clear and compelling.

GeoQuery is the only software that lets you do these things quickly, easily and affordably. It's the perfect get-it-done tool for anyone whose business extends further than the eye can see...

Map Mountains Of Data. GeoQuery knows the location of every 5-digit ZIP code in the US — all 43,301 of them, So in the blink of an eye, your customer lists, prospects, corporate facilities, any ZIP-coded data, are magically pinpointed on GeoQuery's built-in maps.

But GeoQuery shows you a lot more than just your business sites. It lets you see how your data relates to each other. Sales territories to customers. Prospects to dealers. Service personnel to equipment installations.

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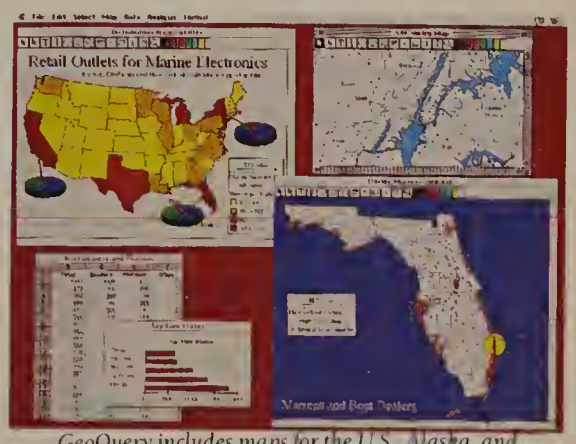
See why *MacWeek* called GeoQuery "the premier data-mapping application available on any desktop computer," and put your business on the map today!



GeoQuery includes maps for the U.S., Alaska, and Hawaii with Interstate Highways and all 43,000+ ZIP code locations. Additional road and boundary files are available.

GEOQUERY

BDT2106 **GeoQuery** $395.00

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Reviews

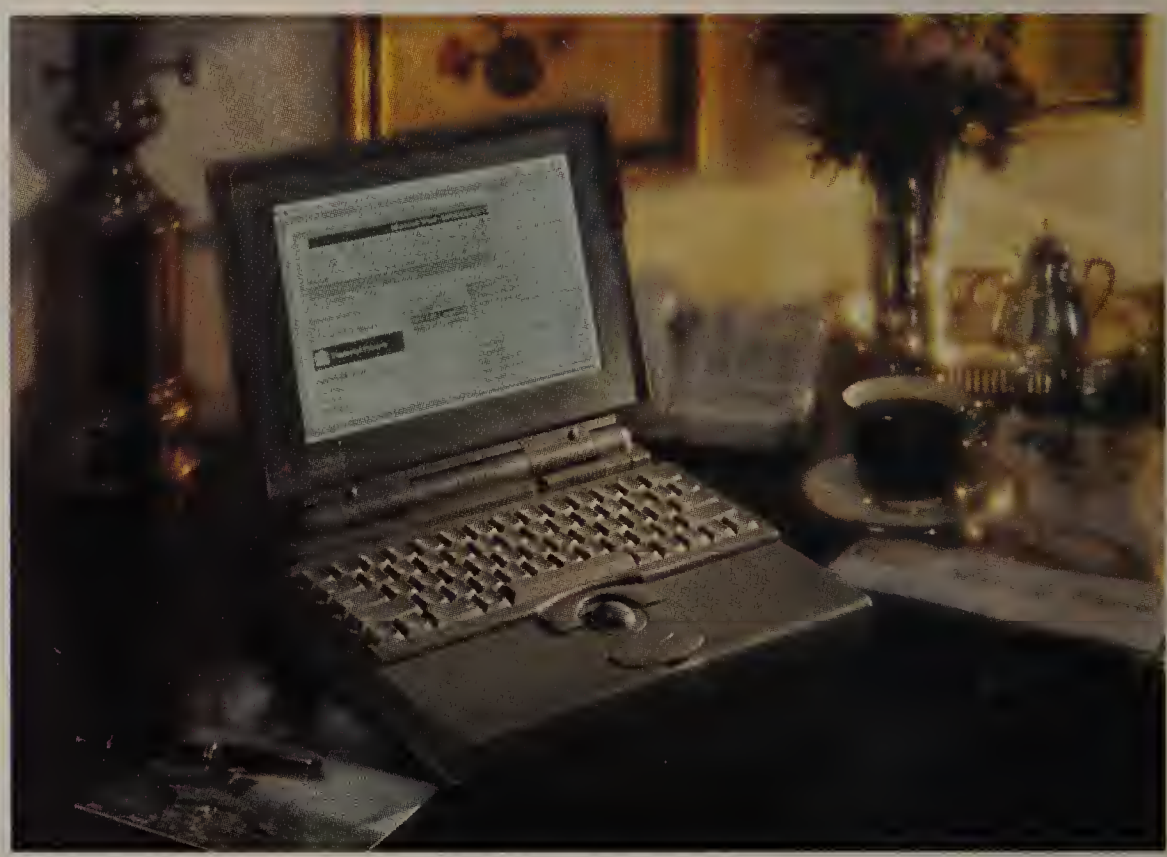
IN THIS ISSUE: PowerBook Duo 210 and 230, Duo Dock, Microsoft Word 5.1, Apple Font Pack, Special Delivery, Aldus Personal Press, Publish It Easy, Picture Press, At Ease, and more

Terminal Emulation

Timbuktu 5.0.1

PROS: Enables users to observe other computers on a network and exchange information with them; customizable security options; supports mixed Mac-and-Windows networks. **CONS:** Cannot cut and paste between Macs and Windows PCs; Windows version skimpily documented. **COMPANY:** Farallon Computing (510/814-5000). **REQUIRES:** Mac version: Mac Plus; 2MB of RAM; LocalTalk, Ethernet, or token ring network using AppleTalk; System 6.0.5. Recommended: 8MB of RAM; System 7. Windows version: 80286-based DOS machine; 3MB of RAM; VGA monitor; mouse; Ethernet, LocalTalk, or token ring network; MS-DOS 3.1; Windows 3.0a. Recommended: 80386SX-based DOS machine; 8MB of RAM; Windows 3.1; DOS 5.0. **LIST PRICE:** $199; 10-user pack $999; 30-user pack $1999; 100-user pack $5500.

MW ★★★★



ROBERT PERRY

IMAGINE A WORK ENVIRONMENT IN which the barriers of distance practically disappear. Where you can access data from anywhere on the network. Or run software on your Mac that you haven't installed. Or operate a colleague's Windows programs from your Mac, or your Mac programs from her Windows machine. That's a sampling of what Timbuktu offers. By letting one computer (Mac or Windows) control, observe, or exchange data with any other computer, Timbuktu lets you use resources almost anywhere on the company network.

There are only a few hitches: Timbuktu must be installed on each computer (and each requires a separate license, to foil pirates). Each machine should have at least 8MB of RAM (that's more realistic than the stated minimum requirements). And any computer you want to access must be turned on.

Most people are likely to use Timbuktu as a fast way to move files among computers. In this use, it looks like any file-transfer program, with a dialog box on the right of the screen with one computer's folders and files and a dialog box on the left with folders and files for the other computer. This is simpler than using AppleShare, since it doesn't require that users create share folders, and you won't clutter your screen as you navigate the other computer's folders to find the data or destination folder you want.

A more limited, simpler version of file exchange permits you only to send data. You just select the files you want to send and choose Send; the receiving computer places the files wherever the user specified in the Timbuktu setup. This is like using E-mail to transfer data, in the sense that people can't see what's on your computer, but it's faster than E-mail and the data's destination is preconfigured, saving the recipient a step. Keep in mind that exchanging simply moves files—it does not translate formats. Cross-platform users will need to either use cross-platform applications or have a translation program on their computer.

System administrators (and nosy bosses) can use Timbuktu to watch what's happening on another computer—they'll see a window with a live picture of whatever the other computer is doing. This is great for network troubleshooting. People concerned about snoopers can lock out any or all observers.

Timbuktu's most powerful feature is its ability to run someone else's computer. Need to look at a Borland Paradox database on the computer of someone

★★★★★ Best — ★ Worst

who's gone for the day? The fact that Paradox is a DOS program won't prevent you from running it and viewing the database from your Mac. Ditto if you need to preview a photo in Adobe Photoshop but the art department is locked. You can just take control of the designer's Mac from your Mac and run Photoshop.

Not only can you run a program on a remote Mac, but you can also cut and paste data from one Mac to another. So you can cut a column of data from your Microsoft Excel spreadsheet and paste it into a colleague's. With Excel running on each machine, you can do any formatting or data manipulation separately, and then exchange columns as you need. Sure beats having to transfer your coworker's spreadsheet to your Mac, make the modifications, and then transfer the modified version back again.

How Much for That Mac in the Window? While conferring with a colleague who was using a Windows computer, I used Timbuktu to call up this Adobe Photoshop file on his computer from the Macintosh on my desk. Running the Windows PC's monitor in 17-inch mode let me see my full Mac 14-inch display while keeping Windows applications and folders also in view.

You also have the ability to share printers and servers. Because you can control the remote computer, you can also use its resources, including resources available in the Chooser via AppleShare or the network's comparable utility.

For all of these features, each user can set passwords and limit who has what sort of access. You can also give other users the privilege of changing preferences, such as whether the screen is in color or whether QuickDraw is bypassed (this saves some RAM, but programs that don't handle their video display solely through QuickDraw will not display correctly on the remote user's Mac).

The person whose Mac is being controlled can also switch a remote user between observe and control modes. (You know that someone is observing or controlling your Mac because an icon appears on your menu bar.) Even if the observer doesn't normally have control privileges, you can grant privileges on an as-needed basis. Timbuktu also keeps a log of any outsiders' access to your computer.

Version 5.0.1 adds support for Macs running multiple monitors and the ability to create connection documents, which let you save settings for preferences and setup information (including passwords) for connecting your computer to another computer. When you double-click on a connection document, Timbuktu makes the desired connection.

Too Good to Be True?

FOR SURE, EACH OF THESE CAPABILITIES comes at a price, but the total bill is low.

The biggest cost is speed. Sending a live screen image over the network takes a lot of data, so expect jerky mouse movements and slow screen redraws when you're observing or controlling someone else's computer. On a LocalTalk network the slowdown is sufficient to prevent long-term work in applications like desktop publishing or graphics. There's far less slowdown on a high-speed network like Ethernet, but dialing in over the phone lines from your PowerBook on a 2400-bits-per-second, 9600-bps, or even the new 14.4-kilobits-per-second modem will be painful enough that you won't want to do much more than check your E-mail. If you're simply plugging the PowerBook into the company network at a branch office, say, then your transmission speed will be that of the network.

Another issue is the need for sufficient resources. Timbuktu itself takes up only about 400K of RAM, but unless you have at least 8MB, that's still too much when using memory hogs like System 7 and practically any new application, whether it be Photoshop or Excel. Fortunately, Timbuktu displays a message when it's running low on RAM.

Another problem is that having two live screens (when using the observe or control features) can be confusing—you forget which computer is the active one. I was most disoriented when moving between the two computers' menu bars because of how the mouse behaves. When you are observing or controlling another computer, the window containing its screen shows only a partial view of that screen, since your desktop needs room for the Mac's menus, Trash Can, and so on. When moving from the bottom of my desktop to the menu bar, I normally just drag the cursor straight across the screen. But as it passes through the other computer's window, it scrolls that screen. It takes a few days to learn to move your mouse around so this doesn't happen. You can disable the live scroll of the other computer's window (there's an icon on the window for this, or you can set this in Preferences). Or you can hold down the option key when dragging.

A third way around this problem is to run one computer in a larger screen so you have plenty of room to see what's going on and to maneuver your mouse. Until recently, Macs couldn't run at multiple resolutions, but companies such as NEC Technologies and E-Machines now offer boards that give you this multiresolution capability (see "The Bigger Picture," *Macworld*, September 1992). With the right Mac-to-VGA adapter, the built-in video on the LC II, Quadras, and IIvx can switch resolutions as well, Apple claims.

Another potential interface confusion is that the standard ⌘-C, ⌘-X, and ⌘-V work only within one Mac. To cut and paste between Macs, you must use controls that, like the live-scroll control, are found on the side of the observed computer's window.

The Mac Does Windows

THERE ARE NOW AROUND 10 MILLION Macs out there, and about half of them in use are near a DOS machine, according to Apple and others. And since its introduction, 10 million copies of Windows 3.1 have been distributed. So it's not surprising that Farallon released a Windows version of Timbuktu at the same time it updated the Mac version. Given the differences in the two operating systems, you might expect Timbuktu to have several large gaps in its cross-platform implementation. Wrong. Using Timbuktu in

continues

a mixed-platform setting is nearly as easy as using it in a one-platform setting.

Farallon did a yeoman's job in giving Windows some of the Mac resources needed to pull off the cross-platform capabilities. The most significant is the Windows Chooser, which lets you reassign a Mac printer to a Windows printer or vice versa. Likewise, you can have Windows programs access your Mac servers or vice versa.

As impressive as cross-platform Timbuktu is, there are a few issues that I wish Farallon would address in future versions. One is the ability to cut and paste between Windows machines and Macs. Technically, it should be possible, since the screen data has to go through the processor and interface of each machine before being displayed. You can cut and paste text between Windows and DOS programs, and several Mac-to-mainframe terminal emulators let you exchange text and some graphics. Now that practically every major application has a Mac and Windows version that reads each other's files, it makes sense to be able to cut and paste data directly among them as well.

Another complaint I have is that if you run DOS in full-screen mode (the default) from within Windows, Timbuktu doesn't show the DOS screen but continues to show Windows. Most users will think they didn't double-click on the DOS icon, so they'll try again, getting two DOS sessions running on the Windows machine, neither of which is visible to the Macintosh. The problem is that because full-screen DOS bypasses the Windows graphical user interface, there's no screen information for Timbuktu to intercept and send on to the Mac. But Windows can also run DOS in a window, which makes the DOS window appear on the controlling Mac. Timbuktu should simply force DOS to run in a window, not as a full screen.

Whereas the Mac version of Timbuktu lets any number of Macs control or observe one another, the Windows version can be involved with only one other computer for observing or linking. In my tests, the Windows PC froze when I had three computers (one Windows and two Macs) controlling or observing each other simultaneously.

The Windows version's manual is skimpy, and lacks the detail the Mac manual supplies on cross-platform concerns. And both manuals should do a better job of covering how to use printers—the current manuals barely touch on the issue.

Timbuktu is a clear winner. Its minor blemishes shouldn't stop you from expanding your desktop's reach.

—GALEN GRUMAN

Notebook Computer

PowerBook Duo 210 and 230

PROS: Extremely small, lightweight, and powerful; longer-lasting, quicker-charging battery; gray-scale screen; excellent keyboard touch. **CONS:** Minuscule trackball; keyboard too narrow; noisy, cheap-feeling spacebar.
COMPANY: Apple Computer (408/996-1010).
LIST PRICE: Duo 210 (4/80) $2249; Duo 230 (4/80) $2609; Duo 230 (4/120) $2969.

MW ★★★★

THE POWERBOOK DUO 230 IS APPLE'S smallest computer yet. It has the pleasing heft, size, and shape of a nice hardbound book, yet it packs the horsepower of a 33MHz 030 chip (even faster than the brain found in the Mac IIci), an internal 80MB or 120MB hard drive, and up to 20MB of memory. (The Duo 210 is identical, except that it runs at 25MHz.) At 4.2 pounds, the Duo approaches half the weight of the original PowerBook, and it's an amazing 1.4 inches thick. Every edge, button, and control is rounded, bulging like a portable CD player or a Ford Taurus. Close the wafer-thin lid/screen, and the Duo automatically goes into low-power Sleep mode; touch a key to wake it again. In other words, the Duo is ready to work—and ready to roll—faster than any other Macintosh.

To achieve the Duo's impressive weight loss, Apple designers placed this PowerBook on a severe and risky diet: no floppy disk drive; no usual row of jacks on the back; no microphone, speaker, SCSI, keyboard, video, or floppy-drive ports. Instead, there's a single, slim, 3-inch-wide connector you've never seen before.

This special connector can mate with three peripherals: an external floppy disk drive (the same one made for the discontinued PowerBook 100); a MiniDock (a foot-long bar crammed with the full contingent of ports); or a full-size, expandable Duo Dock docking station (also reviewed in this issue). (Other MiniDock- and Duo Dock–style contraptions are in development by other companies.) In other words, the Duo itself is designed to be a purebred typing machine. Any component that you won't need on the plane (or in the board meeting) can be left behind on your desk.

That clever scheme works unexpectedly well, and isn't especially crippling on the road, for two reasons. First, the Duo isn't an utter island; Apple shrewdly left a single port on the Duo itself—a printer-or-modem port—so that you can print, telecommunicate, connect to a network, or play MIDI music without any additional gear. (According to Apple, the problems with MIDI that plagued all previous PowerBooks have been fixed.) Second, the external floppy-disk-drive adapter has an ADB jack on it, where you can plug in a full-size keyboard and mouse.

In creating this more-svelte Macintosh, Apple did some things unbelievably right. For example, it endowed the Duo with a magnesium inner frame, making the computer strikingly solid-feeling and sturdy. Apple also did something to the keyboard feel; the keys are completely silent, but have a terrific tactile click. (The exception is the spacebar. Not only does it clack loudly, but it has a chintzy spring-loaded feel, and often requires a goodly whomp to make it register a press.) Because the ultrathin screen is the same kind of passive matrix liquid crystal display (LCD) technology used on the PowerBook 140, 145, and 160, the cursor tends to vanish when you move it quickly—but at least this screen shows 16 shades of gray, making System 7's 3-D icons look great.

In all this downsizing, Apple also did some things unbelievably wrong. For example, it shrank three things you definitely don't want shrunk: the screen, the keyboard, and the trackball. The 7.5-by-4.75-inch screen is 1 inch narrower, and .75 of an inch shorter, than the screen of the other PowerBooks. The keyboard is more than 1 inch narrower than a normal keyboard. And the trackball is more of a trackmarble, having wasted away to a puny 19mm diameter; it's buried in a trough between the palm rests, making it even more awkward to use. After the first two workdays, my right-hand fingers actually ached.

There's one more ergonomics disappointment: one of the mouse buttons has been moved away from the keyboard so far that it literally wraps around the front edge of the machine, like a protruding lower lip. If you sometimes work lying down (you know who you are), this button is prone to inadvertent clicks from, of all things, your stomach.

The Duo comes with new software, too. A control panel gives you great control over battery, backlighting, and hard-drive usage. You also get System 7.1, which the Duo requires. System 7.1 requires upgraded versions of some popular software (Suitcase, for example). Second, the Duo won't start up without a special Duo-specific system extension called an *enabler*. Suppose that one day

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you need to reinstall the System Folder because of a hard-drive problem. And suppose that you're thrilled, because your officemate has a set of System 7.1 floppy disks. Turns out you'll still be out of luck: you won't be able to start up your Duo, let alone install a new System Folder, because System 7.1 upgrade kits don't include enablers—you can only get an enabler disk when you buy a Duo or a PowerBook 180. (When you try to start up, you get the hilariously false message "System 7.1 does not work on this model.")

Fortunately, for every minor glitch that stands in the way of laptop heaven, there's a Duo aspect that's an improvement over the previous PowerBooks. The Duo's microphone is built in, and it picks up your voice perfectly well without your rubbing noses with the keyboard. The screen brightness and contrast controls are easy-to-use push buttons instead of sliders or knobs. The capsule-shape On button is right on the keyboard, no longer hidden by a flap on the back of the machine.

The new power adapter has flip-up cord-wrapping posts. It also features a detachable cord, so that the blocky transformer portion no longer hogs three spaces on your power strip. (Unfortunately, Apple has also added a third prong to the plug, making it that much harder to find compatible outlets.) And speaking of power: the new "four-hour" nickel–metal-hydride battery drives the Duo for about two solid hours of work. That's an improvement over the original "three-hour" PowerBook batteries, which yield about 90 minutes. As an added bonus, the new Duo battery recharges completely in only two hours (instead of eight). Finally, when the Duo is attached to a Duo Dock or MiniDock, you can plug a SCSI cable directly into the Duo from another Mac; the Duo's icon shows up on the other Mac's screen exactly as if the Duo were an external hard drive.

You'll grumble about the cramped keyboard; you may curse at the submarining cursor; you might even have to hunt for the trackball. But you simply can't underrate the importance of this computer's small size and weight. The Duo virtually cries out to be picked up, handled, and used. It's so small that it sloshes around inside carrying cases designed for regular PowerBooks; but it's so light that the carrying-case strap gouges a trench only half as deep into your shoulder. In other words, the Duo achieves an astounding feat: it makes you just as happy walking around the airport as it does once you're on the plane.

—DAVID POGUE

Desktop Housing for PowerBook Duo

Duo Dock

PROS: Ingenious idea; remembers network and monitor status when Duo is reinserted; eliminates file-synchronization headaches. **CONS:** Difficult to install NuBus boards; Duo must be off before insertion or removal; awkward floppy-drive placement. **COMPANY:** Apple Computer (408/996-1010). **REQUIRES:** PowerBook Duo. **LIST PRICE:** $1079.

MW ★★★

ALONE, THE POWERBOOK DUO 210 and 230 (also reviewed in this issue), Apple's tiniest computers, offer little in the way of connectivity. Each has a single printer/modem port, but no floppy disk drive or any other kind of standard jack—that's what makes the duos incredibly small and light.

When you're back from your business trip, however, the last thing you care about is size and weight (of your computer, that is). You want to sit down at your desk and get to work on a full-fledged machine. Apple has solved this apparent conflict of wish lists with the invention of the immensely clever Duo Dock, a desktop Mac-size housing for the Duo laptop. The lightweight Duo Dock has everything a II-series Macintosh offers: back-panel connectors, a SuperDrive, electronic and physical support for monitors as large as Apple's 16-inch color display, and two expansion slots for NuBus boards (accelerators, video digitizing boards, and so on). Apple has given you at least some of both worlds: on the road, you have a fast, featherweight, stripped-down Mac; when you return, you insert the closed laptop into the Duo Dock, to which you've attached, say, a full-size keyboard, mouse, and large color monitor.

You've never seen anything weirder-looking from Apple, that's for sure. The bottom half is dark gray to match the PowerBook; the upper half is light gray, like most Macs. With its wide, squat, cylindrical feet, the Duo Dock looks like something that might land at a space port in *Star Wars*. In the front is a large rectangular mouth, where you insert the laptop. If you push the Duo almost all the way in, the Dock pulls it, videocassette-like, the final ¼-inch into its fully docked, attached position. (Deep inside the Dock, the 3-inch wide connector on the back of the Duo mates with appropriate prongs—according to Apple advertising, an amazing stunt when compared with the unreliable docking contraptions in the IBM-compatible world.) Now the previously functionless Dock has a brain. At this point, you can work as though you have a Mac IIci on your desk. Except that the floppy drive is a shadowy slit halfway back on the Dock's right side, you'll never know the difference.

When you're done working, you shut down normally and press the Eject button on the front of the unit; a few inches of your laptop spring forth into your hands, and you're on your way. (If you press Eject while working, you're first asked to save your work; then your programs quit, and the unit shuts down normally before ejecting the PowerBook. But on my test unit, the Eject button didn't work about half the time when the Mac was in use.) Because you really have only one computer, you have only one set of documents—those on the Duo. You therefore have no headaches of tracking which copy of each file is current (laptop versus desktop Mac), a well-known problem for users of the original PowerBooks.

A number of clever touches make the Duo–Duo Dock combination easy to like. For example, the system remembers its network status when you insert the Duo into its Dock, automatically remounting any shared drives. When docked, the Duo immediately begins recharging its battery. If you buy a special SCSI cable, you can connect a Duo Dock to a regular Mac, SCSI port-to-port, for high-speed file transfers; the other Mac treats the docked Duo as simply another hard drive.

You can add extra memory and an internal hard drive to the Duo Dock. You can even add NuBus boards. I don't mean *you* literally, however; as the Duo Dock manual understates it, installing one of these add-on circuit boards is a "technically challenging" business. You dismantle the Dock into three pieces, unscrew two screws so deep in sockets that you can't see them, detach a power connector, flip a sharp-edged mass of electronics upside down, remove two panels, align pins in all three dimensions simultaneously, press the board into place—and then reassemble all the pieces. It's a far cry from slipping a board into a typical Mac II–type machine, and it's probably a job you (and Apple) would rather have an Apple technician do. This hassle is a huge downfall of the Duo Dock, especially considering that NuBus-board capability is one of its primary selling points over the not-yet-available MiniDock (which offers the same back-panel jacks and video support, but doesn't offer NuBus slots).

The NuBus board mess isn't helped much by the manual, which omits at least

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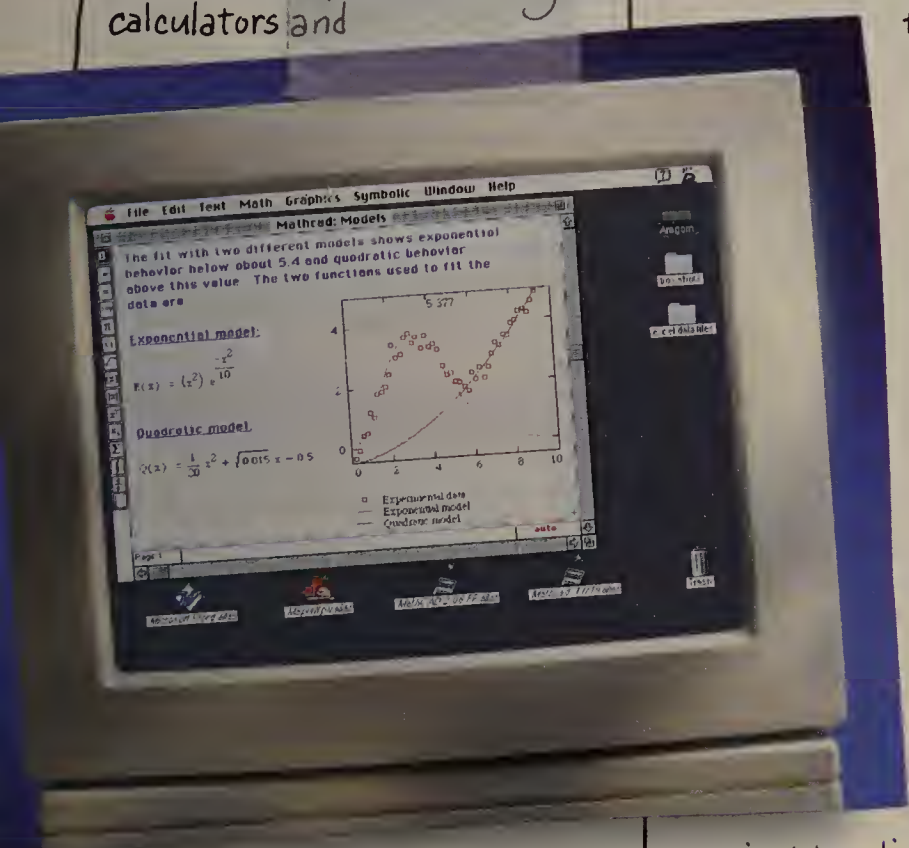

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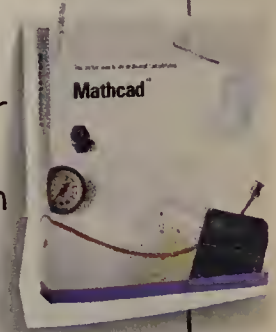

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one important step from the instructions. There's another mistake or two in this manual; for example, numerous instructions stress that the Dock won't operate unless its removable key—which can lock the laptop either in or out of the dock—is in the horizontal position. That should really be *vertical.*

Unfortunately, the laptop must be shut down—not in Sleep mode—before you can insert it or remove it. Shutting down and restarting is time-consuming and inconvenient—ten times more so if you use a *RAM disk* (a piece of memory that the computer treats as a separate drive). Keeping documents, programs, and even a System Folder on the RAM disk, as many PowerBook owners do, avoids using the hard drive, making a Duo battery charge last twice as long. What's nice is that the PowerBook's RAM disk remains intact even if you restart or put the laptop in Sleep mode. But by requiring the Duo to be completely off, the Duo Dock forces you to lose, and subsequently re-create, your RAM disk contents—System Folder and all—every time you insert or remove the laptop.

The difficulty of installing NuBus boards (and memory, for that matter) and the odd placement of the floppy drive reveal slightly less attention to design detail than we've come to expect from Apple. But faced with the alternative—buying a second complete desktop Mac for use in the office—you'll probably be inclined to forgive and get to work.
—DAVID POGUE

Word Processor

Microsoft Word 5.1

PROS: New plug-in modules add icon tool bar, text annotations, and other features; improved spelling and grammar checkers; additional installation options for PowerBooks; numerous minor enhancements. **CONS:** No macro language; toolbar customizing is awkward. **COMPANY:** Microsoft Corporation (800/426-9400). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0.2. **LIST PRICE:** $495.

MW ★★★★

LESS THAN A YEAR AFTER RELEASING Word 5.0, Microsoft has fixed some problems in the Macintosh world's favorite word processor and tacked on a few new features. The result is a minor upgrade called Word 5.1.

The most noticeable difference in Word 5.1 is an optional on-screen tool bar, which joins the ribbon and ruler in providing icons for common functions. The tool bar provides point-and-click access to common commands: Save, New, Print, and so on. The tool bar also provides several timesaving tools. One tool prints envelopes, automatically inserting an address you select as well as your return address. Another inserts a bullet before a selected paragraph and automatically adjusts the paragraph indent so that runover lines align properly. On color or gray-scale monitors, the tool bar (and the ribbon and ruler) have a flashy, three-dimensional look.

You can customize the tool bar to reflect the commands you use most, but it's an awkward process. When you use the Customize dialog box to choose a new command for the tool bar, Word doesn't automatically select the command's corresponding icon. You must scroll through a list of over 150 icons to locate one that seems to match the command you chose—and many of the icons aren't exactly self-explanatory.

The tool bar is implemented as a plug-in module—one of those files that sits in the Word Commands folder and adds new features to the program. Word 5.1 includes new plug-ins that let you create text annotations (electronic Post-it notes) and drop caps. Also included is a plug-in that lets you add QuickTime movies to documents. (This is the same plug-in that shipped several months after Word 5.0.) Word 5.1 also includes the improved and debugged Spelling and Grammar modules that Microsoft shipped in June of last year. Two other plug-ins show minor but welcome enhancements: the Picture window sports a Group tool that combines multiple objects into one, and the Find File module lets you restrict a search to a particular folder.

Word 5.1 also includes Microsoft Graph, which lets you turn tables into graphs. Graph is linked to Word via Microsoft's Object Linking and Embedding (OLE) data-exchange mechanism: select a table in Word, click on the ribbon's graph icon, and Word launches Graph, which creates a graph using the data in the table. If you already use Microsoft Excel to generate graphs and link them to Word documents, Graph may not be of much use to you (although Graph does require considerably less memory than does Excel).

Word 5.0 was often criticized for devouring disk space and memory. Word 5.1 is no leaner. The full installation commandeers 6.5MB of hard drive space—about 1.5MB more than Word 5.0. A new minimal installation option uses only 2.1MB, while a PowerBook installation option sets up Word so that background pagination is turned off, which saves battery power. Speaking of PowerBooks, the ruler has a handy icon that shows how much battery juice is left.

There are a few other tweaks in Word 5.1. The Print dialog box lets you opt to print only odd- or even-numbered pages, which simplifies creating a double-sided document. The file converters for MacWrite II, DOS WordPerfect, and Windows Metafiles have been improved. And the ribbon has a table tool that lets you easily specify how many rows and columns you want a new table to have.

In all, nothing in Word 5.1 is likely to give Word 5.0 users goose bumps or tempt loyal WordPerfect users to switch. Microsoft basically fine-tuned a few of Word 5.0's plug-in modules and threw in some new ones. Word still lacks a macro language as well as many of the best features of its cousin, Word for Windows 2.0.

Still, if you already use Word 5.0, the 5.1 upgrade is well worth the $14.95 upgrade price—especially if you print a lot of envelopes or simply like issuing commands with the mouse. Word 5.1 is a solid, if small, step forward for the Mac's top word processor.—JIM HEID

Presentation Software

Special Delivery 1.0

PROS: Button commands allow extensive control over flow of presentations; can import a wide variety of media formats; easy text entry. **CONS:** Limited transitional effects; confusing button setup; limited timing features for self-running presentation. **COMPANY:** Interactive Media Corporation (415/ 948-0745). **REQUIRES:** Mac II; 4MB of RAM; hard drive; System 7. Recommended: Color monitor. **LIST PRICE:** $399.

MW ★★★

SPECIAL DELIVERY IS ONE OF SEVERAL new entry-level packages designed to make multimedia integration accessible to mainstream computer users such as businesspeople and teachers. While the program has all the tools you need to assemble interactive screen presentations that burst with motion and sound, it has a disorienting interface and it lacks the power and polish of similarly priced multimedia packages.

Creating a presentation with Special Delivery is a lot like assembling a slide show with packages such as Microsoft PowerPoint and Aldus Persuasion—with two dramatic differences. First, Special

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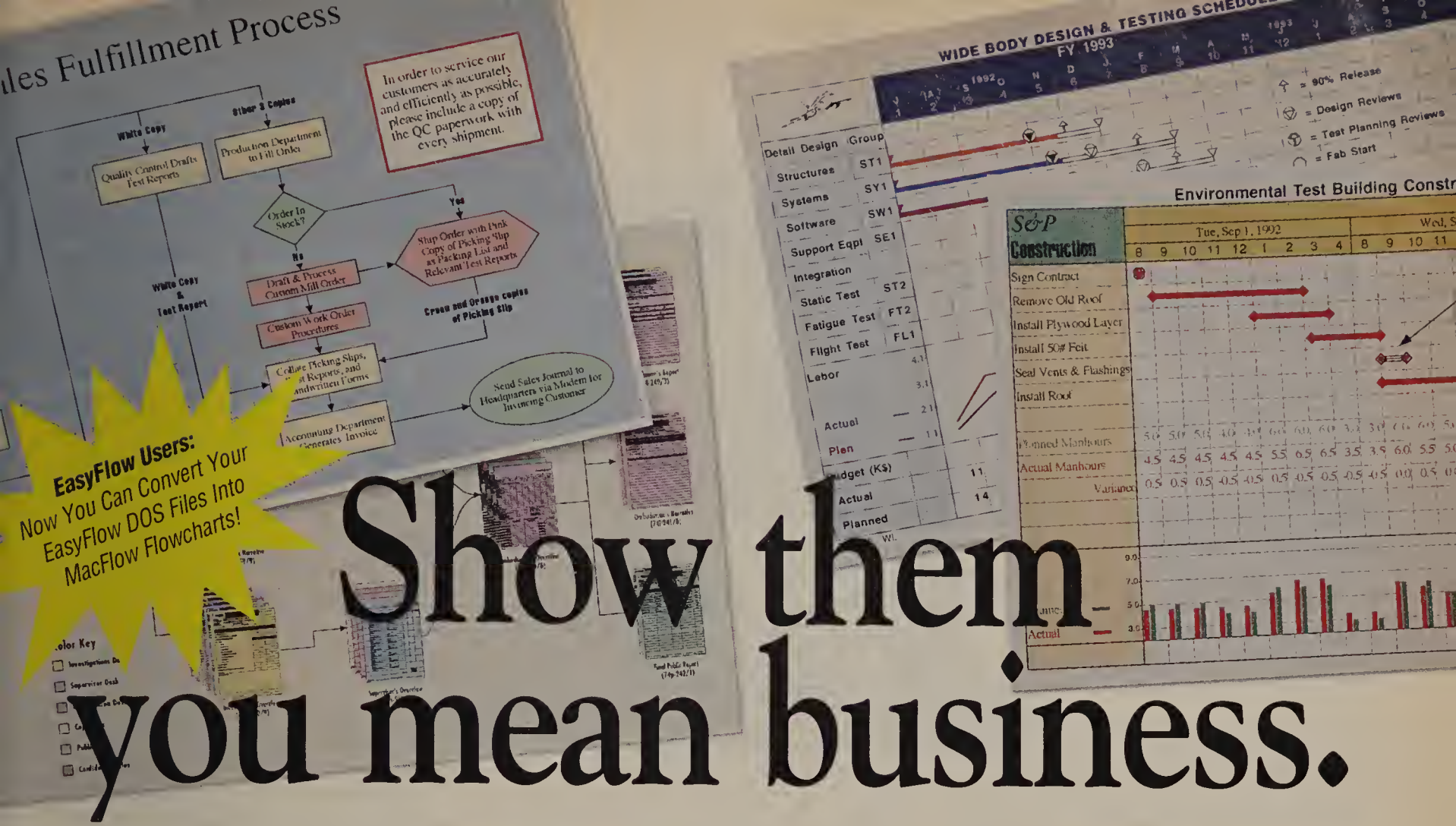

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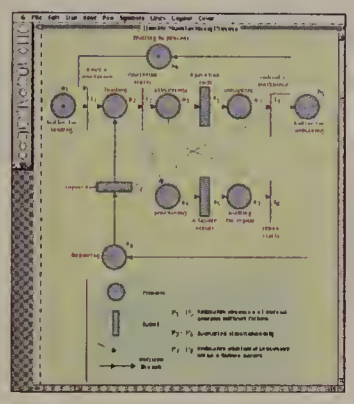

Lay it all out for them—the process, the procedures, the relationships. Business works best when everything is clear, and there is no better way to make things clear than a detailed flowchart.

The best way to create flowcharts is MacFlow—the highest-rated flowcharting program. Neither drawing programs nor pencil and paper can create flowcharts as easily as MacFlow. And no program is simpler to learn or use. Graphically organize complex processes, projects, and structures—minutes after opening the package.

Simply drag pre-drawn symbols onto a page and connect with curved or straight lines. Place text in symbols and on lines, as well as in freestanding notes. Change the chart as desired; lines stretch and stay attached to symbols. Even create stand-alone flowcharts that can be freely distributed to any Macintosh user (and any Windows user with an optional viewer). MacFlow is also System 7-savvy, letting you publish your charts and subscribe to text. Translate to and from text in ASCII and RTF formats as well as outlines created in Acta 7 and MORE.

MacFlow actually enhances your thought process because the interface is so simple and intuitive, nothing stands between your ideas and a presentation-quality flowchart. In fact, you'll find just creating flowcharts keeps your thoughts organized and helps you get a handle on any task.

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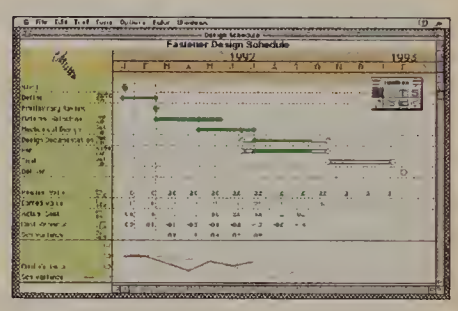
MacSchedule 3.0
Project Planning and Tracking



Lay it all out for them—the plan, the people, the cost. Give them a path to follow and a way to track progress. Successful projects need a roadmap, and nothing can beat a simple yet comprehensive project schedule.

The best way to create quick, presentation-quality project schedules is MacSchedule. The Gantt-chart interface lets you create schedules, with integrated financial data, minutes after you open the application—unlike complex project management software. And MacSchedule is as easy to learn as it is to use.

MacSchedule automatically creates and manages a project calendar. Just enter task names, then indicate timing with a click and drag of the mouse. Status tracking is also easy—just click on a task bar to show progress.

MacSchedule helps track a project from initial estimates to current status by automatically developing calendarized cost estimates and reporting cost and schedule variances in an Earned Value summary. MacSchedule is also System 7-savvy, letting you publish your schedules and data as well as subscribe to data from other programs. Place schedules in documents for proposals and reports or print schedules as slides, overheads, or wallcharts.

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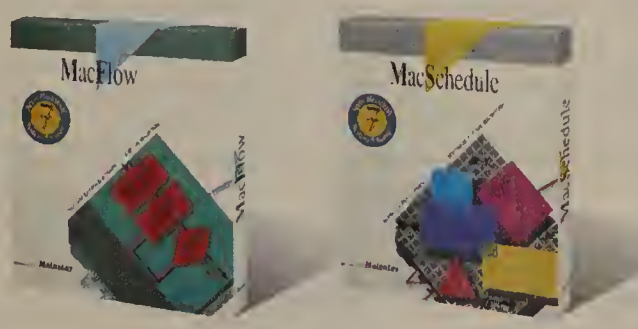

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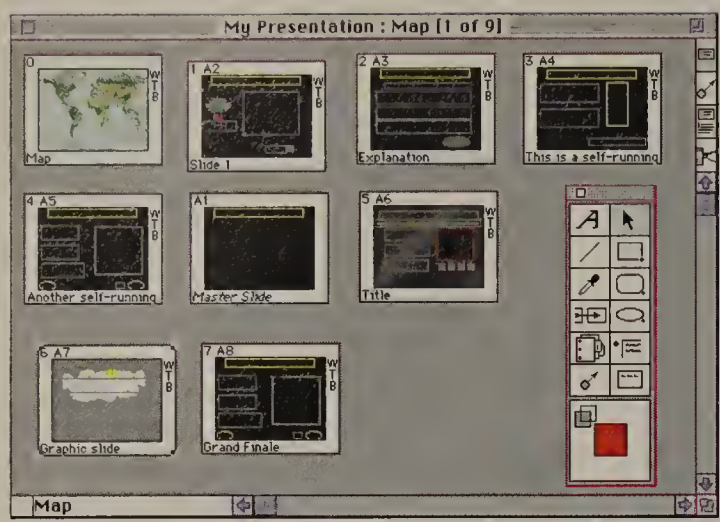

Mapping a Presentation Each Special Delivery presentation includes a Map Slide that shows a thumbnail of each slide and an overview of the whole presentation. You can rearrange slides by selecting the Next tool on the tool palette and dragging across the slides in the order in which you want them to display.

Delivery's slides are dynamic; in addition to words and pictures, they can include any number of digitized sounds and video clips in the form of QuickTime movies. Even static slide elements, such as bulleted text blocks, can be cued to fade, wipe, or fly into view.

Second, Special Delivery presentations can be fully interactive. Instead of having slides flash by at a predetermined rate, you can let viewers control the flow of a presentation simply by clicking on-screen buttons. You can set buttons to play movies and sounds within a slide, navigate to other sequences in the presentation, or reveal words and pictures sequentially.

You begin assembling a presentation in Layout View, drawing portals, or frames, wherever you want buttons or data to appear on a slide. Then using the Place File command, you insert graphics, movies, and sounds into their portals. Special Delivery's importing capabilities are noteworthy: the program handles QuickTime movies; PICT, EPSF, TIFF, and MacPaint images; and sounds in the AIFF, AIFC, SFIL, and snd formats. Inserting text into portals is even easier; you just draw a portal and start typing. Portals can be round or rectangular, framed or transparent. In Button View, you establish links between the buttons and the data portals. You can assign a button the Play command, for example, and then link it to a portal containing a QuickTime movie.

You can also apply transitional effects (wipe, blend, iris, and so on) to the slides or objects that appear within slides, but while some basic multimedia packages provide a palette of 30 transitions, Special Delivery offers only 16—and of those, several are poorly implemented (blend, for example, performs choppily)—and you can't control their speed.

But Special Delivery's biggest problem is the Button View working environment. When you switch to Button View, all foreground and background colors, graphics, movies, and any formatted text you placed in portals while in Layout View vanish from sight. Instead, you see a schematic spiderweb of lines and arrows representing links between the various portals, which are displayed only as dotted outlines. The view is so abstracted that it's disorienting and makes it difficult to visualize your presentation during construction.

Another problem is Special Delivery's lack of tools for controlling the timing of presentations. Most multimedia packages allow you to plot the flow of a presentation on a time line, marking the precise entrance and exit of each object on the screen. Special Delivery has no such feature. That's a serious deficiency when you're trying to synchronize sounds, movies, and pictures.

Special Delivery does give you some control over timing. Using the Delay command, you can stagger the triggering of buttons and transitional effects in increments of one-tenth of a second. But getting a series of screen events to occur at the right time is clumsy at best.

The program ships with a good tutorial booklet, an uninspiring sample presentation, and six graphics files that can be imported for use as slide backgrounds. A better interface, a wider variety of transitional effects, and more-precise timing functions would make Special Delivery an ideal multimedia integration tool.

—JOSEPH SCHORR

TrueType Fonts

Apple Font Pack

PROS: Zeal font includes common symbols and labeling characters; 35 TrueType font definitions. **CONS:** Packaging misstates number of font definitions; 23 fonts duplicate PostScript standards; narrow fonts are not optically condensed. **COMPANY:** Apple Computer (408/996-1010). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 7. **LIST PRICE:** $99.

MW ★★★

REMEMBER TRUETYPE? REMEMBER how it was going to challenge and eventually overtake Adobe's PostScript font standard? Well, guess what? It has, but on the Windows platform, where TrueType represents a giant leap forward in ease of use. Since the introduction of Microsoft Windows 3.1, TrueType fonts have sold through the roof, generating nearly $100 million in revenue for Microsoft alone. Meanwhile, on the Macintosh, where fonts have always been a staple of the system software, TrueType has fizzled. With PostScript fonts firmly entrenched, relatively few folks have seen the need for acquiring or using TrueType fonts.

Perhaps with the intention of generating interest in the TrueType format, or perhaps in hopes of emulating Microsoft's success, Apple is only now getting around to releasing its first TrueType font package since the format debuted a year and a half ago. The Apple Font Pack contains 33 text fonts plus 2 symbol fonts. Apple heralds 43 fonts on the outside of the box, but this number incorrectly figures in italic versions of 8 sans serif and slab-serif fonts belonging to the Avant Garde, Helvetica, and Lubalin Graph families. While the upright styles belonging to these families include italic hinting instructions, the Font Pack provides no optically adjusted TrueType definitions for the italic styles. This means that your word processing or desktop publishing software slants the upright font to a specified degree rather than employing a separately designed italic font. According to this logic, Apple can further bolster its list of advertised fonts by providing hints for a variety of other software-imposed styles, including underline, outline, and—that anathema of desktop publishing—shadow.

Of the 35 font definitions in the Apple Font Pack, 14 are no more than TrueType versions of the PostScript standards Avant Garde, Bookman, Helvetica Narrow, New Century Schoolbook, Zapf Chancery, and Zapf Dingbats. (TrueType versions of the other standards—Courier, Helvetica, Palatino, Symbol, and Times—are included with System 7.) Five others—the remaining Helveticas, the Lubalin Graphs, and Machine—have been members of the Adobe type library for so many years that legitimate and pirated copies pervade every neighborhood service bureau and local bulletin board in the country. Most designers and font enthusiasts I know have long ago tired of these standards. Add to this the four Garamond Narrows—the fonts Apple uses throughout its official literature—which are merely horizontally scaled versions of another popular PostScript family, and you're left with only 12 fonts that haven't been available since the mid-1980s.

continues

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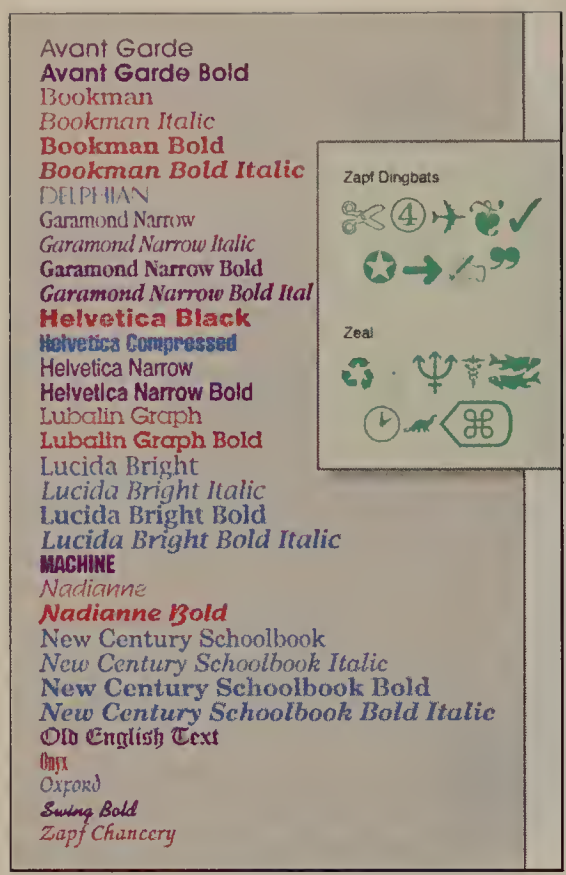


TrueTypes on Parade This font sampler shows the 33 text fonts and 2 symbol fonts that make up the Apple Font Pack.

Incidentally, both the Helvetica Narrow and Garamond Narrow families are numerically reduced in width. Unlike true condensed fonts, they are not optically redesigned, which throws off the font's balance. For example, in an unmodified version of Helvetica, the letter *H* is made up of thick vertical stems with a thinner horizontal crossbeam. In Helvetica Narrow, the vertical stems have been squeezed so that they are slightly thinner than the crossbeam. Max Meidinger, the font's designer, would not have approved.

Having voiced my objections to this package, I must admit it's not a bad deal. Even if you count only 12 fonts, you are spending approximately a quarter of what you would have to shell out for 12 PostScript fonts from the Adobe type library. And while most of Apple's TrueType offerings are licensed from big type foundries such as ITC, Agfa, and Monotype, one font, Zeal, is utterly unique to the Font Pack. Commissioned by Apple and executed by an independent company called The Font Bureau, Zeal contains a variety of useful symbols, including visual aids, planetary and astrological signs, and arrowheads pointing in eight directions (not just forward as in Zapf Dingbats). Not as consistently designed as, say, Zapf Dingbats, Zeal nevertheless goes a long way toward making the Apple Font Pack a viable product, even if you haven't quite made the leap to the TrueType font format.

—DEKE McCLELLAND

Page-Layout Software

Aldus Personal Press 2.0

PROS: AutoCreate feature builds simple documents automatically; Copy Fit command fits text to available space; saves pages as PICT graphics; Additions technology provides for add-on features. **CONS:** AutoCreate and Copy Fit produce ugly, difficult-to-modify documents; templates do not include style sheets; no automatic kerning; only one document can be open; no pasteboard; style sheets limited to character attributes; buggy. **COMPANY:** Aldus Corporation (206/622-5500). **REQUIRES:** Mac Plus; hard drive; System 6.0.3. **LIST PRICE:** $199.

MW ★★

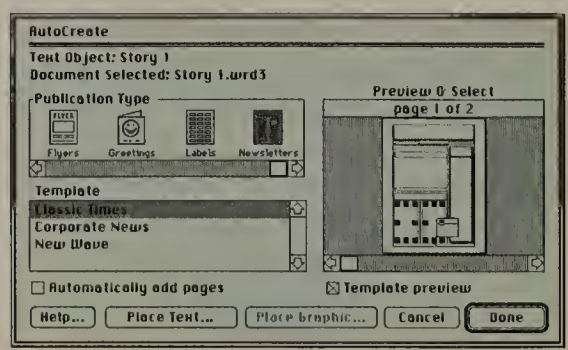
Publish It Easy 3.0

PROS: Extensive tool set for drawing, painting, writing, editing, and page layout; includes File-It database manager; good typographic controls. **CONS:** Document size limited by memory; no grabber hand for scrolling; difficult to position ruler guides; buggy. **COMPANY:** Timeworks (206/628-2320). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0.3. Recommended: System 6.0.5. **LIST PRICE:** $199.95.

MW ★★★

EVERY SO OFTEN YOU COME ACROSS an application that has a lot of cool features—bells and whistles and trinkets and tchotchkes—but is missing other features or implements them so poorly that the good things about the program are rendered almost useless. Microsoft Windows is a great example—it has some nice features, but the eight-character limit to file names makes it unusable. Aldus Personal Press 2.0 is another.

When I reviewed Personal Press 1.0 in the August 1991 issue of *Macworld*, I cited several problems: you could edit text only at 100 percent view; there was no automatic kerning and no hairlines; only one publication could be open at a time; there was no pasteboard; style sheets were limited to character attributes; and there were bugs, notably crashing and object fills printing outside object borders.



AutoCreate Personal Press's AutoCreate feature allows you to build publications by clicking on sections of predefined templates and specifying text and graphics files to fill those areas.

The new version addresses two of these problems: you can edit text at any magnification, and hairline rules are available (though the only option is Hairline; you can't specify a line weight smaller than 1 point). None of the other problems have been addressed. And in testing the latest version, additional problems surfaced. Objects that don't overlap on screen collide on printouts; a gray-scale scan printed with Personal Press's Advanced Halftoning prints reduced to 22 percent of size (though it looks fine on screen); and the program is still prone to crashing, especially when you use the new Additions technology that adds features such as automatic drop caps and bullets.

Personal Press's greatest claim to fame is its AutoCreate feature, which builds publications for you. All you have to do is click on a template and tell the program what text and graphics to put in the predefined containers. Personal Press imports the text and graphics, and prompts you for headlines, pull quotes, and captions. Personal Press copyfits all the stories (adjusting character size, line spacing, and paragraph spacing) so the text fits in the space available.

But when I use an AutoCreate template, the results look like dreck. The main problem is the copyfitting routine. First, the copy you're importing generally doesn't fit. So Personal Press goes to extraordinary lengths to adjust the copy formatting, and it does a terrible job—adding scads of line spacing, for instance, while reducing type size to near-invisibility (in one instance it set 4-point type on 18-point leading).

Second, the Copy Fit command (available independent of AutoCreate templates) applies invisible metaformatting that doesn't appear in the normal formatting dialog boxes. As an example, type that is obviously about 4 points is, according to the Text Settings dialog box, 12-point. That software-knows-more-than-you-do approach makes it difficult to fine-tune a copyfitted story manually and is almost certain to confuse and confound the novices this program is purportedly designed for.

Third, the AutoCreate templates disregard varying text elements within stories. So subheads, for instance, are formatted identically to body copy. Even though it imports the character-formatting portion of paragraph styles from Microsoft Word documents, Personal Press fails to apply those styles to the

continues

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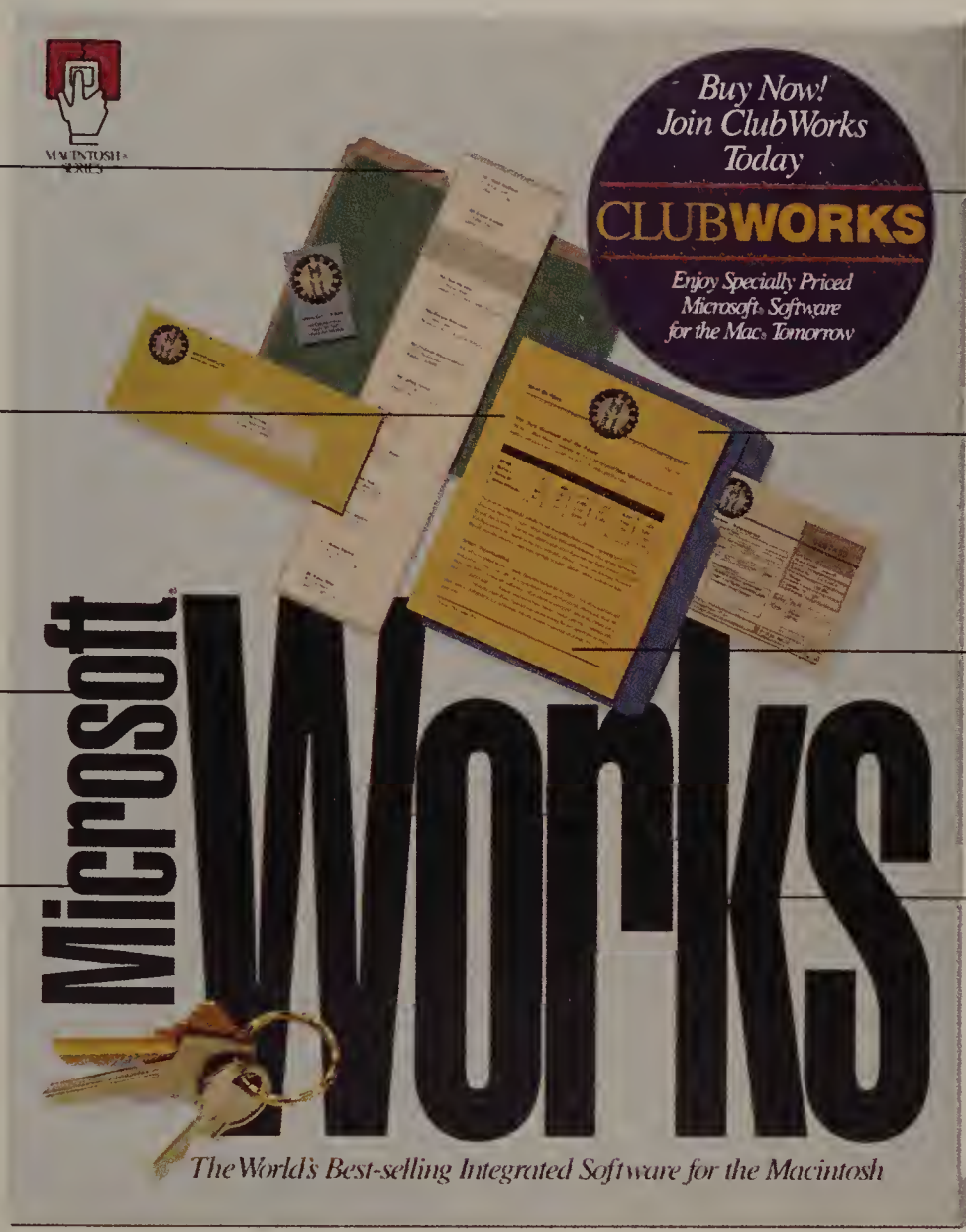

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incoming text or to differentiate between the different kinds of paragraphs.

Though the AutoCreate feature is handy for simple things (creating a certificate; a fax cover sheet; or a sheet of labels with your logo, name, and address), it's almost useless for newsletters, brochures, and fliers—the documents most people will buy this program for.

Even if you ignore AutoCreate and Copy Fit and use Personal Press as a basic page-layout program, it's missing features that novice users really need. A page-layout program that touts its automatic features and usefulness for novices should at the very least support the automatic kern pairs built into Mac typefaces, adjusting the spacing between characters to make the type look good. Personal Press doesn't support automatic kerning, so type from the program (especially headline type) looks terrible when it could easily look much better.

While Personal Press 2.0 adds some new features and strengths—better speed, System 7 support, character- and word-spacing controls (sans keyboard shortcuts), somewhat improved import filters, the ability to save a page as a PICT graphic—it doesn't address the first version's central deficiencies. I can't recommend it to people who care about the professional look of their documents. And if you don't care how your documents look, why buy a page-layout program?

Publish It Easy 3.0

PUBLISH IT EASY 3.0 IS ANOTHER STORY entirely. While it includes a large library of templates (many more than Personal Press), which suffer from the same lack of style sheets as the templates in Personal Press, Easy does offer the tools to produce good-looking documents, and then some. Unfortunately, it suffers from bugs at least as much as Personal Press does.

There are so many tools in Publish It Easy that it was hard to do this review without resorting to a straight feature-list. The program offers writing, editing, formatting, page-layout, drawing, and painting tools—and well-thought-out interface innovations—that you won't find combined in any other program. All of that is packed into 326K of tightly written, fast, assembly-language code (add-on files such as import filters, dictionaries, balloon help, and the like total another 2MB; templates and sample files add 1.7MB). There's even a full-blown, built-in flat-file database.

Easy's writing and editing tools range from disappointing (the selection and cursor-movement keys) to excellent. The Find and Replace commands are pretty rudimentary, but you can search for and replace character formatting in addition to text. The spelling checker is fast and smart, as is the thesaurus (Thesaurus Rex, offering synonyms, antonyms, near-synonyms, and near-antonyms, plus definitions of chosen words—a sigh of relief from all writing teachers, please).

There are tools for case conversion (uppercase, lowercase, initial caps), and there are special text entries for constantly updated page numbers, time and date, "continued to" and "continued from" lines, cross-references to stories (stories can be assigned names), document name, number of pages (for "page 5 of 6"–type entries), and serial numbers (to print multiple copies of a document, each with a unique number).

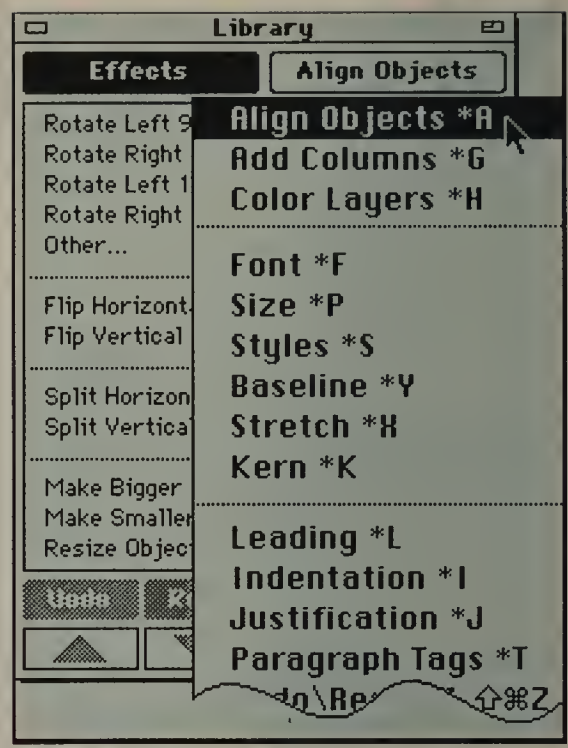
Type and Graphics

EASY PROVIDES TOOLS FOR SETTING TYPE size, line spacing, and paragraph spacing in .001-point increments. There's manual and automatic kerning, dictionary-based hyphenation, and an impressive array of justification options (including by word space and by letterspace, with fine-tuning controls). Paragraph styles can include both character and paragraph formatting, and Easy even imports styles and styled paragraphs from Microsoft Word. That is where Easy's biggest bug resides, however.

Importing Word 5 and Rich Text Format (RTF) files often causes Easy to crash. The workaround is to save the files in Word 3 format and import those, but then text comes in without the style tags. Editing tabs in paragraphs tagged with styles based on no style also results in crashes. Timeworks promises fixes in the near future.

There are rudimentary painting tools and more-than-adequate drawing tools built into Easy, plus impressive capabilities for combining text with bitmapped and object-oriented graphics. You can convert text into a PICT graphic for distortion, for instance, and convert the PICT back into formatted text with the DePicter tool. You can convert PICTs into bitmaps, and blend bitmaps together—whether they were imported or created in the program. There are import filters for MacPaint, PICT, EPS, and TIFF graphics formats.

While I wouldn't call Easy's interface clean and uncluttered (some menus could be rearranged, and there are lots of palettes and submenus), it does offer several methods that help in navigating its potentially bewildering abundance of features. The Library palette makes it easy to choose options without resorting to submenus, and to quickly see the results of changes by simply clicking on options.



Library Catalog Publish It Easy's multipurpose Library palette allows you to change many different document settings by clicking on options rather than going through menus.

On top of all these tools, add File-It—a well-designed database with one of the best-thought-out tools for building calculated fields that I've seen—and you've got what is arguably the best tool on the Mac for database publishing.

Of course, all is not sweetness and light. Aside from the cluttered interface mentioned above, document size in Easy is limited to the amount of memory on your machine. Start using large scanned images and you quickly run into the "can't allocate memory" message. There's no grabber hand for scrolling around the page; you're stuck with the scroll bars and various (well-implemented) zoom techniques. You place and delete ruler guides by clicking in the rulers, rather than by dragging guides out of the rulers, making it tough to put the guides where you want them (this version does allow for multiple ruler guides, however). The only way to set the rulers' zero point is numerically; you can't drag it. Finally, as mentioned above, Easy is not the most stable of programs. I found two situations that crash the program, and there are no doubt more. While I crashed more than once in Personal Press, it wasn't due to predictable, reproducible bugs.

Which to Buy?

SINCE BOTH PROGRAMS ARE EQUALLY unstable, and the price is the same, the choice comes down to features. If you can only spend $200, Publish It Easy offers many more tools than Personal Press—for both speeding your work and producing good-looking documents. Given that, the choice between these two programs isn't even a choice.—STEVE ROTH

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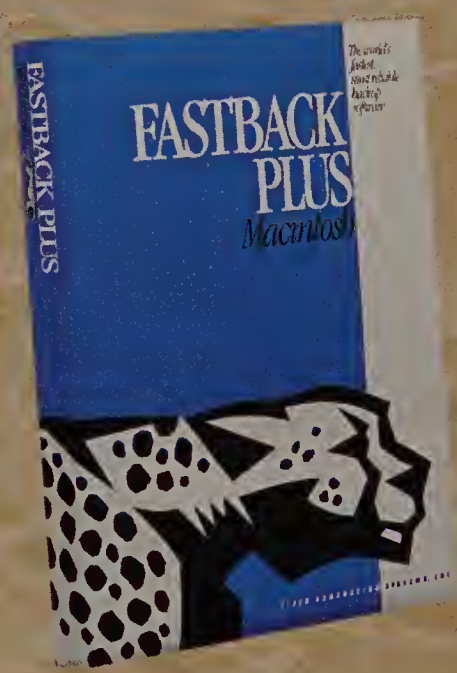

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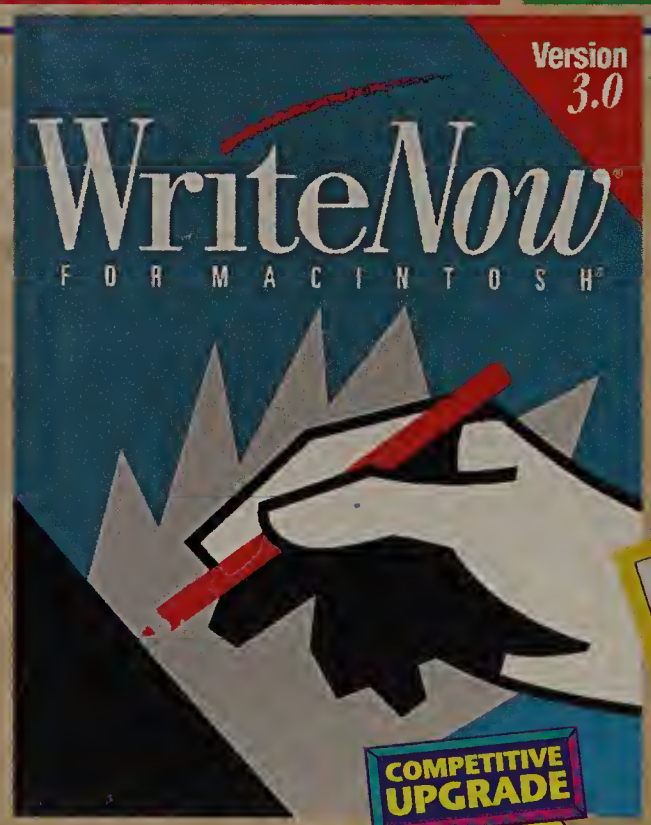
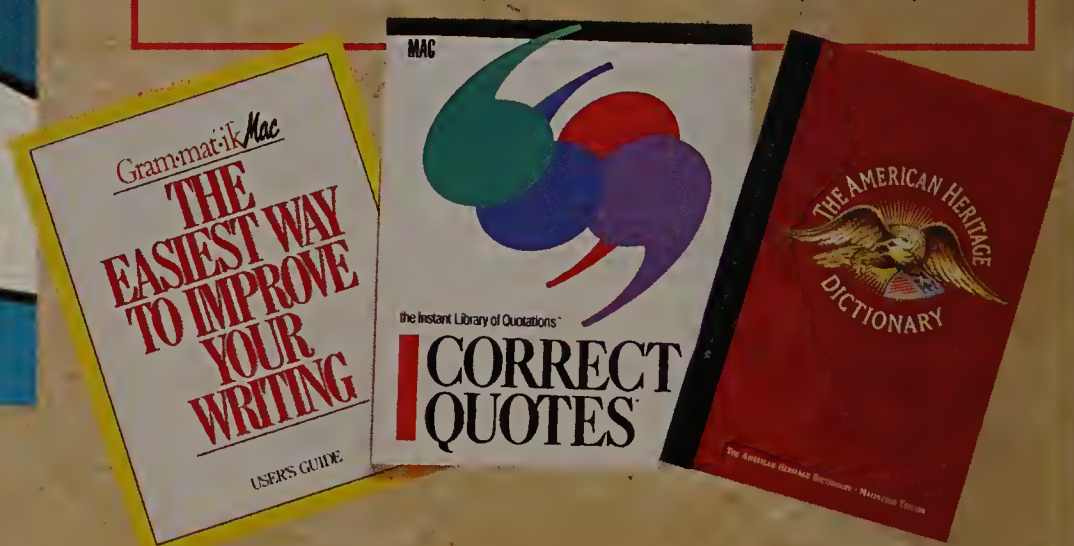


- Awarded four stars by *Macworld*, 1992 (version 3.0)
- Editors' Choice Award, *Macworld*, 1992 (version 3.0)
- "Very Good Overall Value" (second highest), *MacWEEK*, June, 1992 (version 3.0)
- Highest rating for Ease of Use, Speed, Value and Documentation, *Government Computer News*
- Highest overall rating, *Software Digest*, 1990
- Editors' Choice Award, *Computer Reseller News*, 1990
- Editors' Choice Award, Best New Word Processor, *MacUser*, 1989



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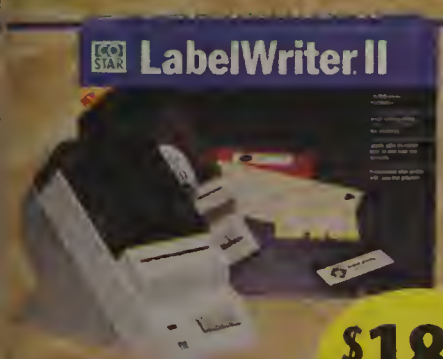

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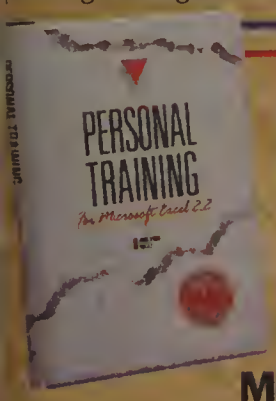

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- 00203 Cricket Graph 1.3.2 ..... $124
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- 06166 Norton Essentials for PowerBook $68
- 00458 Great Works V.2 ..... $196

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- 00863 Autoback $94

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- 05699 PSI Comstation Four $344
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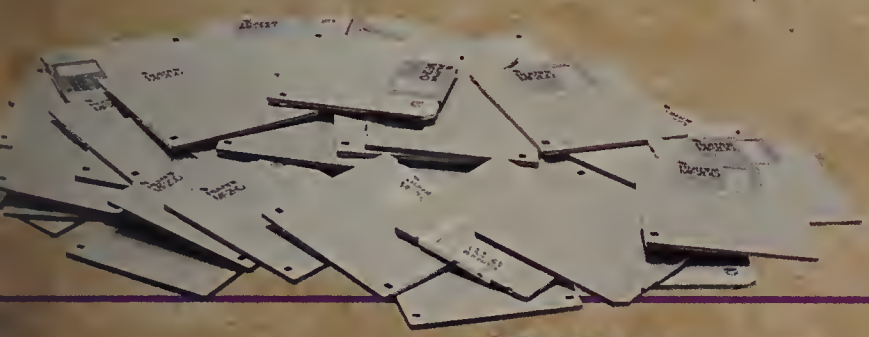

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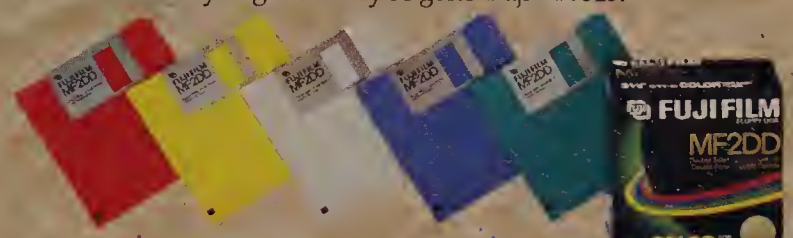

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INIT Manager Utilities

Conflict Catcher and Other Innovative Utilities 1.0

PROS: Conflict test feature helps resolve INIT conflicts; provides control over start-up items at start-up time. **CONS:** Can conflict with security software that locks volumes. **COMPANY:** Casady & Greene (408/484-9228). **REQUIRES:** Mac Plus; System 6.0.5. **LIST PRICE:** $79.95.

INITPicker 3.0

PROS: Loads aliased INITs over a network; disables problem INITs at start-up. **CONS:** No INIT links; cannot choose start-up items at start-up time. **COMPANY:** Inline Design (203/435-4995). **REQUIRES:** Mac Plus; System 7 (System 6–compatible Version 2.0.1 included). **LIST PRICE:** $79.95.

NEXT TO COPING WITH UNRULY SCSI devices, INIT conflicts may be the most annoying problem we Macintosh users have to put up with. (The term *INIT* usually refers to files like screen savers that load into memory at start-up. Under System 7, most INIT files are stored in the Extensions and Control Panels folders in the System Folder. INITs aren't the same as applications and documents that you've set to open at start-up.) Unfortunately, INITs can interfere with each other, causing crashes and other serious problems. Conflict Catcher and INITPicker are designed to manage INITs and root out troublesome conflicts.

Conflict Catcher ships as part of a collection of five system-related utilities. Color Coordinator allows you to assign monitor color settings to specific applications. Memory Maxer (functional only under System 7) lets you instruct applications to grab as much memory as possible at launch time, no matter what the default setting. It also enables you to quit the Finder, increasing available memory on machines with insufficient RAM. HotDA lets you run any desk accessory by typing a user-specified key combination. And Whiz-Bang Window Accelerator speeds up the zooming rectangles you see when you open items in the Finder.

Conflict Catcher is the most important component of the collection, though. Like INITPicker, Conflict Catcher's main function is to give you control over how INITs load when you turn on the Mac. You invoke either program by opening a control panel or by holding down a specific key when you boot. Either way, a scrolling list of all your INITs appears. (INITPicker's interface is more functional.) You can enable or disable INITs by clicking, and you can drag INITs to change the order they load in (INITs normally load according to rules built into the Mac Operating System). Both Conflict Catcher and INITPicker also let you define sets of INITs for specific purposes—for example, you might use one combination of INITs when you're working with a scanner and another when you're editing a QuickTime movie. (Changes made once the Mac is running don't take effect until the next restart.)

Although they share many features, Conflict Catcher and INITPicker do have several notable differences. They both let you choose which applications and documents to open. INITPicker uses a separate application called StartupPicker to specify start-up items. And unlike INITPicker, Conflict Catcher lets you link INITs that always have to load together. (Linked INITs are treated as a unit—enabling or disabling any member of a linked group automatically enables or disables all the other INITs in the group.) But only INITPicker can load aliased INITs stored on a network server. That way, you don't have to keep a separate copy of each INIT on every workstation. Although this trick doesn't work for all INITs, it can be a real boon for network managers who have to deal with frequent software updates.

The major distinction between Conflict Catcher and INITPicker lies in the way they deal with incompatible INITs. Of the two utilities, INITPicker takes the simpler approach. INITPicker's BombGuard feature automatically determines if an INIT conflict is responsible for a crash at start-up and disables the offending INIT or INITs. But INITPicker doesn't help you identify the cause of INIT conflicts that don't cause the Mac to crash at start-up.

Conflict Catcher takes a broader approach to INIT conflicts. For example, let's say that you suspect an INIT is causing the Mac to freeze every time you launch a particular application. You could isolate the problem by turning INITs on or off manually. Instead of testing INITs one by one, Conflict Catcher homes in on the culprit by enabling or disabling several INITs at a time. While this process sounds confusing, in practice it's actually quite straightforward and effective. The tutorial in the manual helps, too—Conflict Catcher even comes with an INIT called Bomber that you can use to practice conflict testing.

Conflict Catcher and INITPicker also differ in their approach to disabling INITs. INITPicker disables INITs without changing their location on disk. Conflict Catcher inactivates INITs by moving them to folders titled "Disabled" that it creates in the System Folder. While that's generally safe, installer programs that aren't aware of the Disabled folders

continues

INIT MANAGERS COMPARED

Product	List Price	Enable and Disable INITs at Start-Up	Change Load Order at Start-Up	Multiple INIT Sets	INIT Links	Loads Aliased INITs across Networks	Specify Start-Up Applications and Documents at Start-Up	Conflict Testing
Conflict Catcher 1.0	$79.95 (includes four other utilities)	●	●	●	●	○	●	Automatically activates and deactivates INITs to pinpoint conflicts
INITPicker 3.0	$79.95	●	●	●	○	●	○	Inactivates INITs that cause crashes at start-up
Startup Manager 4.0.1	$149 (part of Now Utilities)	●	●	●	●	○	●	Inactivates INITs that cause crashes at start-up

● = *yes*; ○ = *no*.

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can generate duplicate copies of INITs. (When Conflict Catcher finds more than one copy of an INIT, it asks if you want to erase the inactive one.) Also, security software that unlocks volumes at start-up has to load first for Conflict Catcher to function properly. (Although INITPicker worked reliably for me, several people have reported crashes at start-up, a problem acknowledged by INITPicker's developer, Microseeds. Users who plan to upgrade from earlier versions of INITPicker should call tech support before installing INITPicker 3.0.)

Conflict Catcher and INITPicker both compete with Startup Manager, an excellent INIT manager that ships with Now Utilities (see "INIT Managers Compared" for an overview of their major functions). For routine INIT management, Now Utilities is a good value—for an extra $70, you get Startup Manager plus several other indispensable utilities. INITPicker's ability to load INITs over a network makes it a consideration for network managers. Finally, Conflict Catcher's ability to track down INIT-related problems makes it a worthwhile investment even if you already own an INIT manager.—FRANKLIN N. TESSLER

Equation-Writing Software

Expressionist 3.0

PROS: Well-designed, customizable symbol palette; DA version included; good compatibility with Theorist; diligent customer support. **CONS:** Problems converting files to Word. **COMPANY:** Prescience Corporation (415/543-2252). **REQUIRES:** Mac Plus; System 6.0.2. **LIST PRICE:** $199.95.

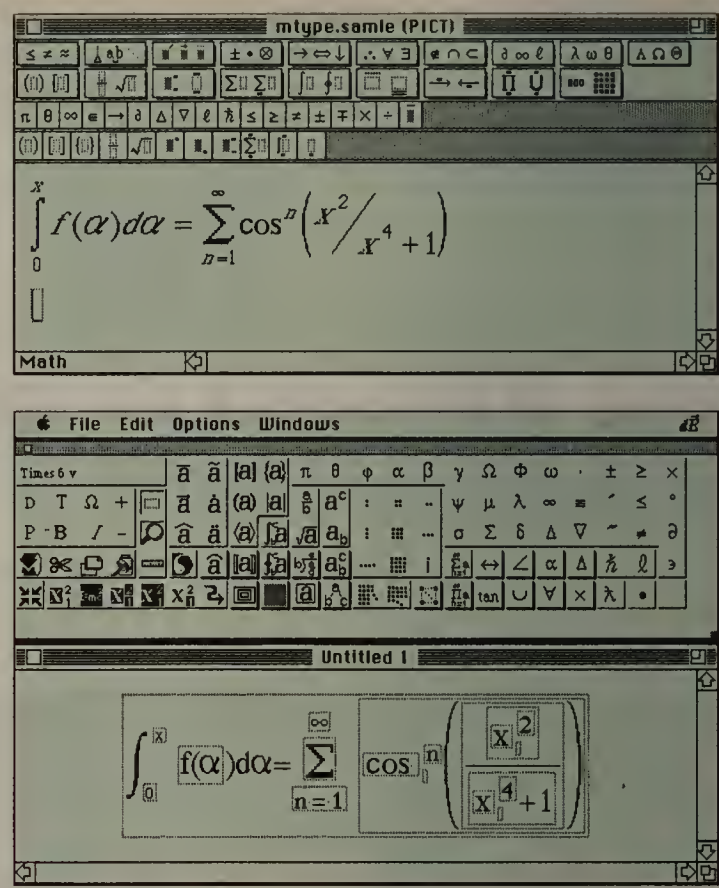
MW ★★★★

MathType 3.0

PROS: Good automatic spacing; of all equation processors, has best interface to Word; Windows-version compatibility. **CONS:** Overruling built-in decisions can be tedious. **COMPANY:** Design Science (310/433-0685). **REQUIRES:** Mac Plus; hard drive; System 6.0.3. **LIST PRICE:** $199.

MW ★★★★

TYPESETTING MATHEMATICAL NOtation is such a nuisance that for years publishers simply accepted handwritten equations in typed manuscripts. The publishers would have the equations typeset, eliminating most of the nuisance for the author anyway. Now typesetting has been dumped back in the lap of mathematicians, physicists, and engineers, who are expected to master the Tex typesetting language or use some program to generate camera-ready mathematical copy. This would be a great leap backward in convenience, except that, on the Mac at least, authors have a choice of several easy-to-use equation editors. Two of these are Expressionist and MathType. Both offer convenient palettes of symbols instead of command sets to define notation; both provide precise control over symbol placement; and both save as native, PICT, and encapsulated PostScript (EPS) files and export files to Tex (see "Go Figure").



Go Figure The top figure shows MathType's basic palette of pop-ups, and the bottom one shows Expressionist's. Don't like the selection of elements? You can customize either interface.

If you were to survey several years' worth of reviews of these two programs, in *Macworld* and elsewhere, you would find one described as much more intuitive and easier to use than the other, with nearly equal frequency for each program. The programs are indeed different in style. Expressionist involves you in some details of symbol placement at the outset and gives you extensive capabilities for customizing not only the symbol palette but the keyboard and spacing conventions as well. The symbol-manipulation conventions in Expressionist are the same as in Prescience's Theorist, so many potential users will already be familiar with the Expressionist palette (equations can be imported and exported directly between the two programs). MathType, in contrast, has a more elaborate set of internal rules governing symbol spacings and conventions (variables are automatically italicized, for example), so you do more plain typing and less positioning.

Which approach is easier in practice? That depends mostly on your equation-writing work load. If you produce one document with a few equations in it once a month, you should probably get MathType, or simply get along with MathType's baby brother, Equation Editor, built into Microsoft Word 5.0. (Equation Editor lacks EPS and Tex support and most customization features—you can upgrade to MathType from Equation Editor for $89.) MathType's automatic typographical decisions are also helpful if you produce documents on a wide range of subjects and don't have the time or inclination to fine-tune the output. If you grind out a paper a week on similar topics, you can tinker with Expressionist and arrive at a customized version that lets you work at amazing speed, producing equations with exactly the printed appearance you want.

Beyond these differences in orientation, the programs compete on an assortment of features. MathType has a macro bar for storing complex expressions you'll reuse. Expressionist can draw tree diagrams with a few keystrokes. MathType integrates smoothly with Word and is available in a completely compatible Windows version. Expressionist can use color in equations and backgrounds, and has a search-and-replace facility for symbols. MathType supports Microsoft's Insert Object command; Expressionist uses the Edit Graphic Object convention implemented by Apple events under System 7. There are perhaps 20 such points of comparison, each offering a modest advantage for specific user needs.

Both programs are very, very good—they're miles beyond the old equation command set built into earlier versions of Word and, meaning no disrespect to the brilliant program that originally defined math typesetting on computers, much more usable by humankind in general than Tex is. If you work in an environment with a mixed assortment of Macs and PCs, MathType has an edge, while Expressionist rewards extra effort with more meticulous Mac output control. But four years of competition has refined both programs to the point where you wouldn't regret buying either one.
—CHARLES SEITER

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32003T

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Image-Compression Software

PicturePress 2.5

PROS: Fast and flexible; generates previews for EPS and EPS-JPEG files; offers selective compression. **CONS:** Graphics-oriented users may find it overly technical. **COMPANY:** Storm Technology (415/691-6600). **REQUIRES:** Mac II; System 6.0.7 (System 7 required to run Frontier routine); 32-bit QuickDraw. **LIST PRICE:** $199.

MW ★★★★

MACWORLD'S LAST LONG LOOK AT image compression ("Image Compression Matures," March 1992) covered seven hardware and software compression products. Since then the field has sorted itself out into products from Storm Technology, products licensed from Storm, and products that have disappeared or transmuted. JPEG (Joint Photographic Experts Group) compression is at the heart of many Mac developments—QuickTime, Kodak's Photo CD system, and Adobe PostScript Level 2, for example—but Storm alone has made compression the core of its business.

PicturePress 2.5 is the latest example of this commitment: it supports every useful storage mode, it has new calculation features for improved image fidelity, it offers utilities with practical advantages for day-to-day graphics work, and it's an honest factor-of-two faster than version 2.0X. For those who would like to follow the mathematical evolution of compression, the product includes the only authoritative general-audience manual ever issued on the topic. There is the slight problem that the same rigorous scientific tone pervades all aspects of the manual; Storm needs to find a way to explain advanced compression options without expecting struggling artists to examine Huffman tables.

The PicturePress utilities, on the other hand, show plenty of concern for the graphics community. The plug-in for Adobe Photoshop works perfectly (it also works with QuarkXPress and Letraset's ColorStudio) and saves Photoshop paths along with the compressed image. Since PicturePress also makes high-quality 24-bit PICT-JPEG previews for EPS or EPS-JPEG compressed files (for quick transmission to PostScript Level 2 output devices), you only need to handle your files at full size when you're actually working on them—stored files and transmitted files can always be compressed. This confidence in compression is possible because PicturePress offers a unique feature (part of JPEG++ and implemented in a commercial product only by Storm) in which you can specify higher image quality in selected parts of an image. Fine detail and text thus don't get blurred by compression/decompression as broad color sweeps in the image get squashed by 50:1.

PicturePress ships with a product called PictureDeCompress, which you can distribute with your compressed images, and includes Frontier Runtime from UserLand Software so you can write an Apple-events–based script to compress or decompress whole folders of files automatically.

PicturePress 2.5 is the software-only version of PicturePress Plus, which works with Storm's PhotoFlash Accelerator board. The main payoff in the $999 board-plus-software package is that it puts the board's speed to work in QuickPress (another Storm product included in the package), which substitutes automatically for QuickTime to improve frame rate and workable image size in movies. Ironically for the larger market of graphics users who simply need to open images, work on them, and put them away several times in the course of a day, PicturePress 2.5 is so good (it's as fast as some hardware JPEG accelerators were two years ago) that it's made the board unnecessary, although the board is still valuable for very large (more than 20MB uncompressed) images. If you work with images professionally, PicturePress 2.5 is now the clear choice in compression products.—CHARLES SEITER

Computer-Assisted Drafting

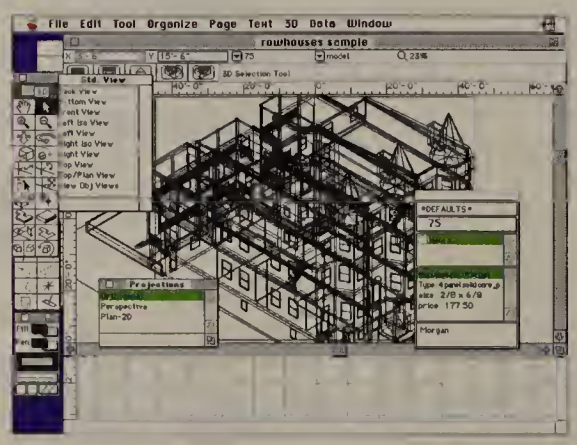
MiniCAD+4

PROS: Fast; complete; 3-D features are nearly as fast as 2-D ones; intelligent cursor truly helpful. **CONS:** Complexity discouraging for beginners. **COMPANY:** Graphsoft (410/461-9488). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive. **LIST PRICE:** $795.

MW ★★★★

THE LAST TIME I LOOKED AT MINICAD+ (version 3.0, *Reviews*, July 1991), we put it in the first rank of Mac computer-aided design (CAD) programs. By recruiting and incorporating suggestions from users (Graphsoft runs lots of contests and has an interactive newsletter), Graphsoft has maintained MiniCAD+'s features-champion status and has improved the program's ease of use. Whereas the original MiniCAD was in some respects the world's most souped-up draw program, MiniCAD+4's feature list competes with that of Autodesk's AutoCAD—surpassing it in some areas—and equals that of ClarisCAD. However, MiniCAD+ is not the best choice for newcomers to CAD (Graphsoft's Blueprint, for example, is a better starter kit).

A serious increase in 3-D functionality and new features for architects are the main differences between MiniCAD+ versions 3 and 4. The number of 3-D drawing tools has been increased, the tools have been reorganized into their own tear-off palettes, and palette symbols and headings are easier to interpret. The Smartcursor feature (the cursor continuously reports relevant information about the drawing on the active layer) works in 3-D; you can select flyover and walkthrough tools and move the cursor over and into your structure in 3-D. Flyover and walk-through are just two of the enhanced 3-D viewing features in version 4. MiniCAD+ now also offers cabinet and cavalier projections, easy rotation of large 3-D structures in a variety of projections, and (at last) scroll bars on drawing screens.



Constructive Attitude MiniCAD+4 not only offers a full range of 3-D drafting features, but it also offers improved redraw speed.

Some basic drafting tools have also finally been included: there's now a provision for tolerancing in the Edit Dimension dialog box, and there's a chamfer tool on the 2-D palette. When you create fillets on screen, a dialog box for fillet radius appears (the program checks whether indicated filleting is possible). And there are more options in line styles. MiniCAD+'s new construction tools include wall, roof, and floor tools; cavity walls; and walls with automatic cuts for doors and windows. By using these new tools, you can cut the drawing time for a simple one-story house plan nearly in half. Somehow, Graphsoft has made this giant (a 2MB application) program show acceptable redraw speeds on a Mac II.

MiniCAD+ still includes spreadsheets linked to drawings for generating bills of materials, and the MiniPascal language for generating drawing macros, but the richer feature set is version 4's main attraction. Although there's a helpful introductory video, the manuals have been refined, and MiniCAD+'s phone support is the best in the business (everyone in the office knows the product, and there's no automated phone system), this product is now mostly for professional engineers and architects; and they should be delighted with this highly competent package's evolution into three dimensions.—CHARLES SEITER

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32003Q

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Desktop Alternative

At Ease

PROS: Extremely safe and simple to use; inexpensive; satisfying visual and audio feedback.
CONS: Not smart about duplicate file names.
COMPANY: Apple Computer (408/996-1010).
REQUIRES: Mac Plus; hard drive; System 7.
LIST PRICE: $59.

MW ★★★★

PROMPTED, PERHAPS, BY THE FINDER's increasing complexity, and by the need for parents and service bureaus to protect their hard drive contents from the hazards of unschooled mousers, Apple created At Ease. It hides the Finder (including the desktop, folders, the Trash, and even the Control Panels item in the Apple menu). In its place, At Ease displays an attractive page full of oversize icons—or, rather, two pages: one shows programs and another shows documents. You click on a jumbo folder tab, labeled Applications and Documents, to switch from one page to the other.

If there are too many icons to fit, arrows appear at the bottom of the page; a mouse-click slides an additional pageful of icons into view, with a delightful grating sound.

How do the icons get onto the launching pages? You, the administrator (parent, teacher, store owner, or whatever), put them there. The At Ease control panel lets you choose programs and documents for inclusion on, or removal from, the display panels. You might put only your kids' programs on the At Ease screen, for example.

There are two purposes to all this: simplicity and security. The simplicity comes from having no system of folders to navigate. A single click on an icon launches the pictured (and named) document or program. There is no conceivable way to make opening a file any easier. When you quit the launched program, you return not to the Finder, but to the At Ease screen.

There's security, too. Because there's no Trash Can, nobody can delete a file. You can't rename or move files, either. You can switch back and forth between At Ease and the Finder, using a Go To command that gets added to your File menu—but only if you type the correct password (optional). Another feature prevents you from saving a new document onto the hard drive, instead prompting you to insert a floppy disk every time you use the Save command.

At Ease takes up only a third as much memory as the Finder and is thoroughly enjoyable to use. But because At Ease has no system of nested folders, it gets confused if there are two documents with the same name residing in different Finder folders; it displays only one of them, and you have no way of knowing which one you're seeing. At Ease will, if you want, automatically add an icon to its pages for each new document you create—but if, in the Finder, you delete a document, At Ease isn't smart enough to remove the document's icon from the launch pages. Finally, At Ease always shows icons in alphabetical order; every time you create a new document or add a program to the At Ease screen, the existing icons get shuffled into new positions. The result: you (and your kids) can't rely on your visual memory of a file's location to help you find it, as you unconsciously do in the regular Finder. These limitations, combined with having to jump to the real Finder any time you want to find, rename, move, or delete a file, negate At Ease's convenience for non-administrator types.

For its intended purpose, At Ease works splendidly. There's no way to lose a document in a folder; no way to destroy your data; no chance that somebody will change the fonts, desk accessories, monitor setting, or other System settings you have set up. At Ease is a simple substitute for the Finder, but once you've launched a program, you're back into the regular Mac world of submenus, zoom boxes, and Cancel/OK buttons. Now if someone would write At Ease–level replacements for Word, Excel, and Adobe Illustrator.—DAVID POGUE

File-Synchronization Software

Inline Sync 1.0

PROS: Simple to learn and use; automates updating files between desktop and PowerBook.
CONS: None. **COMPANY:** Inline Design 203/435-4995). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 7. Recommended: 4MB of RAM. **LIST PRICE:** $129.95.

MW ★★★★

FOR MANY PEOPLE, THE ADVENT OF the Macintosh PowerBooks heralds the portable extension of the desktop Mac. You can now transfer files from a desktop Mac to a PowerBook, work on those files away from the office, and transfer them back when you return. Unfortunately, with this flexibility it's easy to lose track of just what document is on which machine. Worse, if you have outdated versions of documents on either machine, Murphy's Law dictates that the latest version will not be on the machine that you're using.

Microseeds' Inline Sync solves the problem by scanning the hard drives of two machines, finding matches in the names of files and folders, and automatically copying the latest version to the appropriate machine. The program works on any two drives that you can mount on the Mac's desktop, so you can synchronize files and folders between two SCSI drives attached to your Mac, a local hard drive, and a drive across a LocalTalk or Ethernet network, or even between a local hard drive and a drive mounted via modem and AppleTalk Remote Access.

Using Inline Sync is simple. After you launch the program, a dialog box that has two pop-up menus containing the mounted drives appears. Choose the two drives you want to sync, one from each pop-up, and click on the Synchronize button. Inline Sync scans the two drives and builds two file lists that show you folder and file hierarchy. You can view only one file list at a time; you switch between the lists by clicking on a drive's selection button. The program picks possible matches between the two drives, or you set links between files and folders manually, which works better. The program also has filters that let you automatically mark and link files based on a variety of criteria, including file creator or type, characters in the file name, and file date.

To link two files manually, you first view one file list and click next to the files you want to synchronize; you then view the other list and click next to the corresponding files. If the selected file has no corresponding file on the other drive, the program can copy the selected file to the other drive. Inline Sync marks linked files with a double-headed arrow. The program's default is to copy the newer version of a file, replacing the older version, but you can also manually tell the program in which direction to copy the file.

If changes have been made to both files leaving it unclear which file is the current version, Inline Sync asks you to manually specify which version should be replaced, if any. The Multiple File Versions dialog box gives you the option of copying neither version, both versions, or the current version.

After the file-selection process, you click on the Sync Now button and the program goes to work, copying files back and forth until the drives are synchronized. If you click on the Sync Later button instead, a dialog box appears for you to specify a time for the automatic synchronization. You can set it for one time or for recurring synchronizations. You can also save synchronization file choices as documents called QuickSyncs. A scripting function allows for extremely complex file matching, linking, and syncing based on Boolean operators.

Inline Sync is a fine solution for the vexing problem of keeping the latest versions of your work on both your portable machine and your desktop Mac. With such needless complexity in many programs, it's a relief to find a program that does one thing, and does it so well.—TOM NEGRINO

THE NEXT WAVE IN COLOR PRINTING.

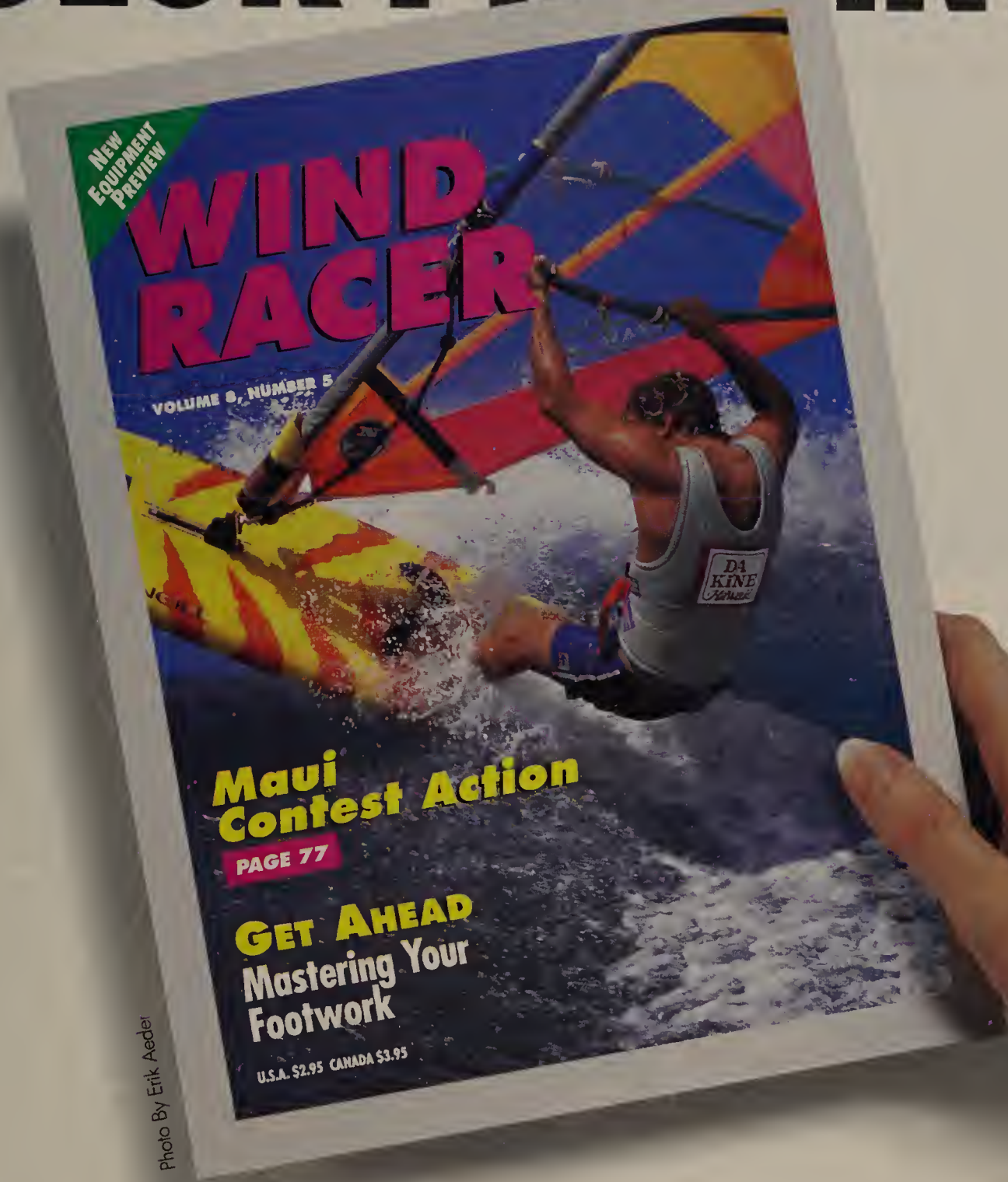

Photo By Erik Aeder

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32003R

CD ROM of Mac Art

Rodney's Wonder Window

PROS: Original and wacky; demonstrates a variety of animation and graphics approaches. **CONS:** Slow; not especially interactive. **COMPANY:** The Voyager Company (310/451-1383). **REQUIRES:** Mac II; 4MB of RAM; 13-inch color monitor; QuickTime-compatible CD ROM drive; System 6.0.7. **LIST PRICE:** $39.95.

MW ★★

IT'S NOT EASY TO CATEGORIZE RODney's Wonder Window, a showcase of colorful graphics and animations created by Rodney Alan Greenblat over the past several years. It's charming but uneven. Whatever it is, it's capable of keeping a child (or an adult with a high tolerance for whimsy) entertained for a couple of hours or more.

The main screen of Wonder Window presents you with 12 icons, and then (after you click on the More button) 12 more, for a total of 24, with names like Future, Wigglelife, Chip & Peg, Birthday, Holiday Fun, Birdwalk, and Hamster.

Several of the selections are elaborate and sophisticated; some are not. I selected the modules in order from the upper left of the main screen; the first four—Fun, Fly Guy, Spider, and Kiss & Fight—were pretty and/or cute, but not all that interesting. Things picked up a little when I moved to the right side and clicked on DataShorts. This is one of the more interactive bits; you get to change the colors and patterns of a pair of boxer shorts. Next I tried Tooli Bugs, which turned out to be a lengthy, ponderous, but fairly entertaining animation in the manner of a science film—Mating Habits of Tooli Bugs—with voice-over narration. The bugs are cute little fellers, but their story is a bit depressing (and might disturb or confuse young children): the hapless female, trapped by the male in a glue-like substance and forcibly impregnated, "experiences discomfort" and delivers voracious "knoblings" who grow up quickly to repeat the cycle.

Some of the modules are just assortments of Mac art by Mr. Greenblat. Art Gallery 1 has simplistic drawings with oddball captions like "Conservative or kooky, a new hair style can make you feel differently about yourself." Art Gallery 3's lovely images tell an elaborate story of a dream about a guitar; Sloop, a semianimated nautical tale, is also visually beautiful.

Rodney's Wonder Window maintains a perky, surrealistic mood; its leisurely pace (typical for a CD ROM) doesn't quite jibe with its visual vigor. Some parts are fun (the QuickTime movie of Chip and Peg's trip to Shapeland, for example); I was disappointed by a few that seemed to promise interactivity without delivering it (particularly Roadside and Mr. Rotato Head). But see "Top 10 CD ROMs," in this issue, for a much more favorable opinion—my *Macworld* colleagues deemed this disc a winner.

It may look like a work in progress, but Rodney's Wonder Window still serves as an entertaining sampler of a wide variety of graphical and interface approaches. I wasn't captivated at first—I kept wanting it to be more interactive—but I did like it and will be eager to see what Mr. Greenblat comes up with next.—FELICITY O'MEARA

Land of the Owl An image from the 3D Views module: the Great Owl, guardian of Canworld, who symbolizes freedom, self-reliance, and triumph over ignorance.

CD ROM Travel Guide

America Alive

PROS: Entertaining; easy-to-use interface. **CONS:** Superficial content; frequent grammatical errors. **COMPANY:** MediAlive/CD Technology (408/752-8500). **REQUIRES:** Mac LC; 4MB of RAM; color monitor; CD ROM drive; System 7. **LIST PRICE:** $99.

MW ★★

AMERICA ALIVE USES QUICKTIME movies, color photographs and maps, text, and audio as a guide to our country's states, major cities, amusement parks, and national parks.

Pop in the disc and you've got a map of the 50 states, the names of which are enclosed within a rectangular box for selection purposes. Since it's winter, you're probably thinking of traveling to Florida (how George Hamilton of you). Click on the Florida text box, and a second window, containing a map of the Sunshine State, materializes. Located atop the window is a secondary menu bar, from which you can choose to read about Florida, view color photographs in a slide show, watch a QuickTime movie, and turn the sound on or off. To obtain information on a destination within Florida, click on any of the text boxes shown on the map.

Most desktop travelers will head straight for the QuickTime movies. While the videos are entertaining, most were produced by a city or state visitors bureau and say more about the art of hyperbole than anything else. Besides, anyone who makes a travel decision based on watching a jerky, low-resolution, two-minute promo displayed in a small corner of a computer screen deserves what they get.

The disc's disappointments begin when you click on a text icon. The text windows provide, in most cases, only a sketchy overview of a place. Clicking on the weather, accommodation, recreation, or other icons within the text window's menu bar doesn't yield much useful information, either—for example, there are only five hotels listed for New York City. Even worse, almost every article contains egregious typos: Washington's Olympic Park is great for "picnicing"; U.S. history is colored by "agressive" ambition; the New Orleans Mardi Gras is a "frezied" peak of excitement. A few grammatical gaffes can be overlooked, but it's hard to take the disc seriously when there are so many mistakes.

Going Somewhere? America Alive's QuickTime video, color photos, and text can help you plan your next vacation.

While America Alive casts a wide net, there are some glaring omissions—Walt Disney World, Disneyland, and Graceland aren't even mentioned (nor is Dollywood, but that's another story). The 2MB America Alive program is also a bit greedy: to run properly, America Alive needs to be copied to, and launched from, your hard drive, and it requires System 7, despite the package's claim of System 6.0.7 compatibility. Fortunately, a System 7.0.1 installer is included.

On balance, this is MediAlive's first travel disc, and the concept is a promising one (the company plans to release a floppy-disk version early this year). For now, though, stick with a traditional guidebook. Your coworkers would have been terribly impressed had you planned a trip using a multimedia CD ROM, but who cares? You're going to Florida in February and they're not.—JAMES A. MARTIN

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3-D Type-Effects Software

StrataType 3d 1.0

PROS: Straightforward interface; excellent control over bevel shapes; good positioning aids. **CONS:** Only one light source; characters can't be individually positioned; mediocre output quality. **COMPANY:** Strata (801/628-5218). **REQUIRES:** Mac II; 5MB of RAM; hard drive; System 6.0.5. Recommended: 8MB of RAM. **LIST PRICE:** $295.

MW ★★

STRATA'S STRATATYPE 3D WAS AMONG the first of the new generation of 3-D type-effects software—programs that simplify the task of creating photo-realistic three-dimensional text. StrataType 3d is well designed and has some excellent features, but it finishes an overall second to its primary competitor, Pixar Typestry (see *Reviews, Macworld*, November 1992).

Conceptually, StrataType 3d and Typestry are identical: both let you use your existing TrueType or PostScript Type 1 outline fonts to create three-dimensional text to which you can apply realistic-looking textures—marble, polished chrome, bricks, granite. Both programs also have stiff hardware requirements: a Mac II–class machine with a math coprocessor (that leaves out the Mac LC, LC II, and stock IIsi). StrataType 3d requires 5MB of RAM, although 8MB—the amount Pixar recommends for Typestry—is more realistic.

Like Typestry, StrataType 3d presents an untitled window and tools for creating, rotating, and resizing text. (StrataType lets you work with numerous open documents simultaneously; Typestry can open just one document at a time.) As in Typestry, you enter text using a dialog box that also lets you choose a font and select a bevel shape to give characters a rounded, routed, or sharp-edged look.

To create a new text object, you choose from 50 canned positioning schemes. Characters can be arranged in an arc, within a circle, along a wavy line, and more. StrataType 3d also lets you adjust the size and shape of the bevel edge. Typestry provides no canned positioning schemes and doesn't let you modify the bevel shape. Typestry does, however, let you select and reposition individual characters to fine-tune their spacing. StrataType 3d doesn't—you can't, for example, drag an *O* so that it tucks beneath a *T*. This is a surprising omission in a program that provides excellent positioning aids—on-screen rulers and a snap-to grid (both of which are missing in Typestry).

You apply textures in StrataType 3d by using the texture palette. This floating window displays thumbnail approximations of each texture, making it easy to pick the desired one. You can edit textures to change their colors, glossiness, and other attributes. You can also turn a PICT image (such as a scan of a piece of burlap) into a new texture. To create textures in Typestry, you must buy Pixar's LabelMaker utility.

One of StrataType 3d's biggest shortcomings is one of Typestry's strengths: lighting. Typestry provides 18 light sources, but StrataType 3d provides just one, eliminating the ability to add backlighting or subtle highlights. No photo-realistic 3-D program should use just one light.

As for rendering—the final phase of any 3-D imaging endeavor—StrataType 3d straightforward dialog box lets you choose the desired quality and resolution settings. Like Typestry, StrataType 3d can render in the background under MultiFinder or System 7. Image quality is very good, though not in the Typestry league.

Neither Typestry nor StrataType 3d is perfect. The ideal 3-D type program would combine StrataType 3d's rulers, textures palette, custom bevels, and canned positioning schemes with Typestry's animation skills, single-character positioning features, lighting capabilities, and superb rendering quality. In its present form, StrataType 3dd is a second-best choice for 3-D text work.
—JIM HEID

Network-Monitoring System

Network Vital Signs 1.0

PROS: Full-featured monitoring options. **CONS:** Monitoring too many devices slows down CPU performance. **COMPANY:** Dayna Communications (801/531-0600). **REQUIRES:** Mac SE; 2MB of RAM; System 6.0.5; AppleTalk protocols over LocalTalk, Ethernet, or token ring. **LIST PRICE:** $449.

MW ★★★

NETWORK MANAGERS ARE OFTEN thought of as doctors of their domain, having the ability to diagnose trouble on the network and take corrective action before the patient collapses. Unfortunately, the first reports of symptoms usually come from angry end users feverishly working on a project due yesterday. Dayna offers the network manager assistance with Network Vital Signs, a fault-monitoring application that continually watches selected network devices and services. Its full-featured approach does more than just notify you if a device has gone up or gone down, but its performance drags down the vital signs of the monitoring Mac.

Network Vital Signs runs on the network manager's Mac. Once installed, Vital Signs polls all currently operating devices on the network. This can take time, depending on the size of the network. It took Network Vital Signs almost 4 minutes to find 541 devices on my network. An option exists to monitor only the devices you want, but it is cumbersome and doesn't allow you to easily select the devices via a list.

After you construct a device list, you then configure Network Vital Signs to alert you when a device becomes a problem. Alerts range from a recorded voice message giving you specific information such as "AppleTalk networks have changed" to using Ex Machina's Notify software to send a page to an alphanumeric pager.

What separates Network Vital Signs from similar applications is that it tells you more than whether a device is up or down; the application can monitor specific equipment for specific errors. For example, it can monitor the status of a printer's paper supply, or track the network zones on a Shiva FastPath. Also, vital signs can be set to monitor network performance for most devices by timing the rate at which data reaches them; response times below a certain rate are then reported back.

I started out monitoring 75 assorted devices; this bogged down my Mac IIcx considerably. (According to Dayna's tech support, increasing RAM or using a faster CPU does not significantly increase performance.) I whittled my list down to 45 devices and found that to be a comfortable level of background action. Dayna's tech support said that the most devices you can monitor without noticing performance degradation is 10. Dayna also recommended that I curtail my use of the advanced monitoring features, since adding more than the up/down indicator also adds to the amount of time the CPU takes to exchange data with each remote device.

Which brings me to my one complaint: the detailed capabilities of some monitoring options (for example, monitoring network traffic) overtax the Macintosh IIcx, so Dayna suggests that you must use these capabilities less often. This is unfortunate, since the extended monitoring features worked as promised, notifying me within the time frame I specified that a device was out of service.

If you need to monitor up to 40 devices, Network Vital Signs might be just the tool for you. Its extensive device-monitoring features work well, and the variety of alerts add to this functionality. If you need to monitor a large number of devices (more than 40) and still need to use your Macintosh, you would be better off searching elsewhere or waiting for a new version of Network Vital Signs; it has the potential to become a leader in network diagnostic software.
—MATTHEW R. CLARK

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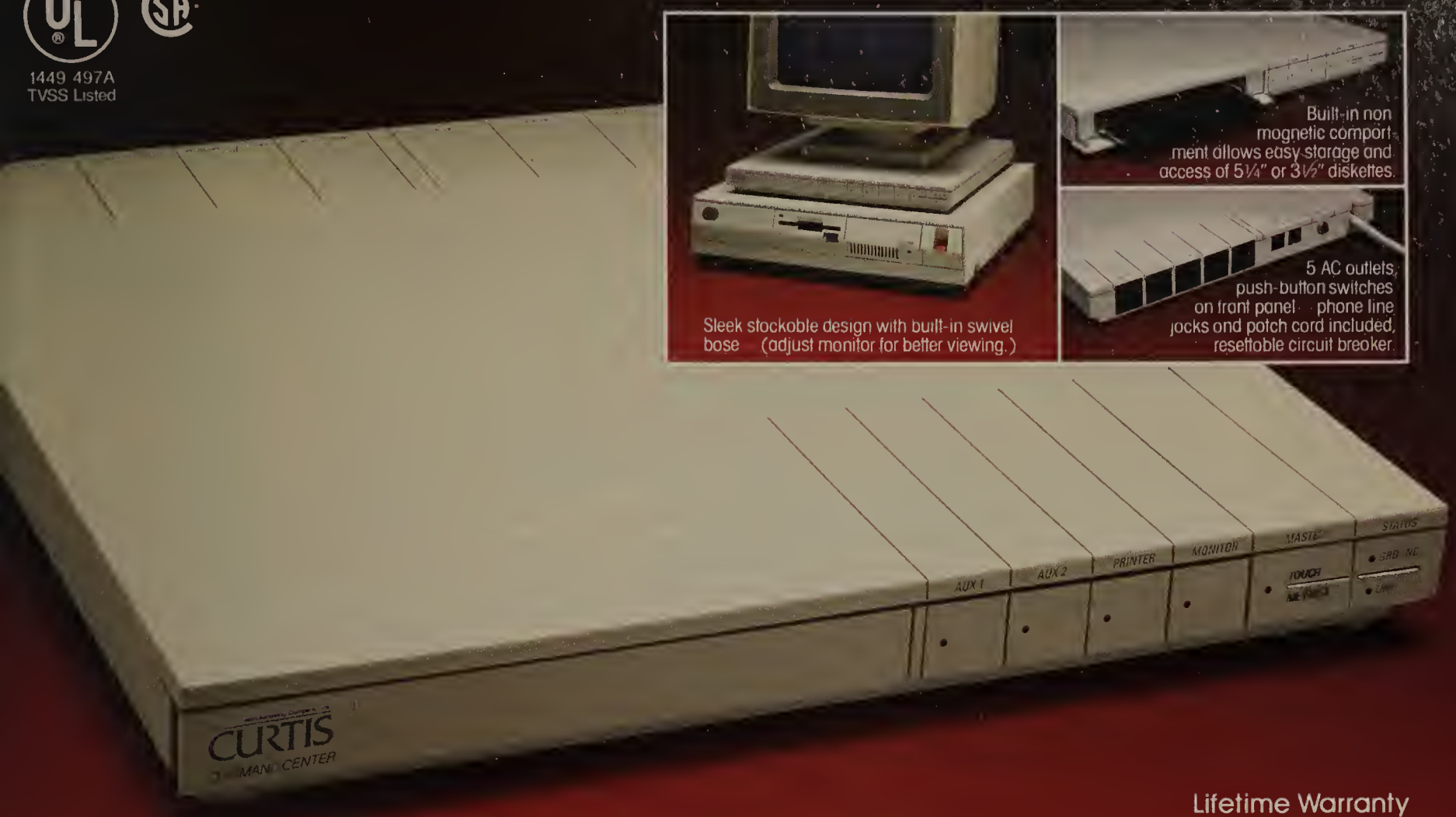

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Game Software

Battle Chess Enhanced CD ROM

PROS: Vastly entertaining; effective way to interest the Nintendo generation in chess. **CONS:** Sometimes difficult maneuvering pieces in 3-D; not a top chess competitor. **COMPANY:** Interplay Productions (714/553-6678). **REQUIRES:** Mac LC or Mac II; color monitor; CD ROM drive; System 6.0.7. **LIST PRICE:** $79.95.

MW ★★★

IN BATTLE CHESS (IN 3-D MODE ANYway), chess pieces are elaborately detailed cartoon characters that act out little dramas of strategy and capture, complete with sound effects. Some experienced chess players find this grotesque; others will find it hilarious. Youthful gamesters raised on Super Mario Bros. find this more congenial than the austere world of 2-D, black-and-white chess.

The CD ROM version is an even more elaborate attempt to make a version of chess that will drive kids mad with glee. First, there's a tutorial in which the animated pieces individually come forward on the board and explain their moves. The performances, from the Queen's vain and mildly salacious spiel to the grumpy declamations of the Pawn, are actually quite vivid—evincing lots of thought to making the chessboard a little stage. Once the play starts, you are tempted to throw away pieces just to see the coolest effects: Knight-takes-Knight is good for a stimulating sword-clanging row, the Queen's zapping procedure is worth watching, and Castles' coming to life as monsters made of bricks is a nice touch. If these are ploys to ensure that the easily bored beginners play enough games to develop some feeling for chess, it's got to be an improvement over learning the game from an older sibling.

The only drawback to the Battle Chess approach is the sheer volume of packaged hoopla on the CD. The CD has 30MB of animation and 45 minutes of sound effects and tunes; this makes the game rather slow (tested on a IIvx, which has a double-speed CD player) unless you have enough free hard drive space to transfer the program. Interplay needs to maintain compatibility with PC versions, but the situation really calls for the cleverest JPEG/QuickTime programming available. Screens, at least at the beginning of a game, are fairly crowded—selecting and moving the pieces call for more mouse dexterity than you use in word processing. Finally, the chess-playing algorithms in Battle Chess are not state of the art, probably in the interest of speed. If you set Battle Chess on level six (there are ten levels of play) and play it against the equivalent level in Software Toolworks' Chessmaster 2000, it loses pretty consistently. Since the game is really meant for beginners, this isn't a serious problem. But if you become a serious chess player, you'll eventually want Chessmaster or Interplay's own higher-level game, Checkmate.

As a game combining intellectual activity with arcade-quality mindless fun, Battle Chess is hard to beat. I hope someday to play a holographic version in which you get to experience a chess game in 3-D as a knight.—CHARLES SEITER

Knighthood in Flower The enhanced CD ROM version of Battle Chess has pieces act out their own introductions. Always-popular battle effects in capture are now even better.

Educational Game

Where in America's Past Is Carmen Sandiego?

PROS: Excellent design and graphics; educational; entertaining. **CONS:** Insufficient documentation; high-density drive required to install color. **COMPANY:** Brøderbund Software (415/382-4400). **REQUIRES:** Mac Plus; 2MB of RAM; hard drive; System 6.0.4. (For color: 4MB of RAM; high-density drive; System 6.0.7.) **LIST PRICE:** $59.95.

MW ★★★★

IT'S 1752, AND SOMEONE HAS STOLEN Ben Franklin's kite. Without it, he won't be able to discover electricity. How to avert disaster? You can find the villain and recover the loot with Where in America's Past Is Carmen Sandiego?, the new addition to the Carmen Sandiego series. Burglaries of varying historical significance create the plots for this educational game, in which your job is to travel through time and space around America, compiling clues to discover where the villain has taken the loot.

You begin as a greenhorn detective at the Acme Detective Agency in present-day San Francisco. After receiving your assignment, you prepare your Chronoskimmer, Brøderbund's time machine, for a trip to the scene of the crime—in this case, colonial Pennsylvania. You can consult sources, ask bystanders, eavesdrop for clues to the thief's identity and whereabouts, and travel to any state and any 25-year period in America's past. (Before 1800 is one time period.)

A bystander might inform you that the villain wanted to thank Pocahontas for saving John Smith's life, or that she was trying to prevent the assassination of John Kennedy. But you don't have to know that Smith was saved in Virginia in 1606, or even that Kennedy was shot in Dallas in 1963. Brøderbund, cleverly, for everyone who doesn't retain large portions of American history, includes Gorton Carruth's book *What Happened When: A Chronology of Life & Events in America* (Harper & Row, 1989). Without this book, the game is a bust, unless you're a history-trivia buff.

The thief is one of the V.I.L.E. (Villain's International League of Evil) henchmen: Carmen Sandiego and her cronies, who have names like Claire Voyant, Casey Rah Sirah, and Della Kitessen. The search produces information about the villain and his or her possible location. Compiling these clues can guide you to the thief's identity and current hideout, leading to an arrest and another solved case for Acme.

America's Past, designed for ages 12 and up, is entertaining and can even be challenging for adults. Fairly easy to install and play, the game is clever, creative, and well designed. The interface is simple, and buttons and menus are self-explanatory. Also, the program covers a broad range of historical subjects in addition to politics.

The documentation is insufficient: eight pages cover three separate computer systems. Aspects of the application are explained in the documentation, but it's difficult to follow and provides few concrete tips on how to win the game.

America's Past ran slowly but decently on my Mac Plus, but I couldn't install the color version on a Mac II; the color installer comes on high-density disks, so you need a SuperDrive. (According to Brøderbund, the color version is not available on 800K disks.) When I did see the game in 256 colors, it was very attractive and included beautiful photographs and drawings for illustrations, though it wreaked some havoc with the computer's color setup.

While the inadequate documentation and the color-version problem may frustrate some, the game's pros far exceed its cons. Like its series companions—which include Where in the World? and Where in Time?, and even a television show spin-off—America's Past is educational and a lot of fun. Hurry! Ben Franklin and his kite are waiting.—JOANNA PEARLSTEIN

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Note-Taking Software

Spiral 1.0.1

PROS: Simple to use; has special PowerBook features; expands abbreviations; supports tabs and bookmarks; calculates in text. **CONS:** Problems importing and exporting; no ruler or margin settings; no repagination. **COMPANY:** Technology Works (512/794-8533). **REQUIRES:** Mac Plus; 2MB of RAM; System 7. **LIST PRICE:** $129.

MW ★★★★

SPIRAL IS THE FIRST PROGRAM DESIGNED specifically for taking and organizing notes on the Macintosh. Each notebook file is like a HyperCard stack and can have small, medium, or large pages. In addition to multiple fonts and sizes, notebook pages can include special font styles such as circled words and strike-through. Each page can include a single graphic, which is automatically centered at the top of the page.

As your text grows toward the bottom of the page, Spiral automatically creates a new page. If you add text to a page you've already filled, Spiral inserts a blank page to catch the overflow, rather than repaginating the whole as a word processor would.

Notebooks can be divided into sections, indicated by labeled tabs on the right-hand side. Within sections, you can select important text and link it to the section page, which is something like a chapter table of contents. Doing so creates a new heading on the section page. Clicking on any of the section-page headings moves you directly to the page on which the linked text is found. You can also insert temporary bookmarks on important pages, allowing you to quickly return to where you left off editing, for example. Otherwise, navigation between pages is accomplished by clicking on the floating navigation palette.

Technology Works included several features just for PowerBook users, such as a Sleep command for saving power, an optional oversize cursor, and a battery-charge indicator. Spiral is also engineered to minimize its use of the hard drive, eliminating many delays while waiting for the PowerBook's hard drive to power up.

Other useful features include the ability to calculate numbers in the text, timed reminders to save, and autosaving a document when you close it. You can also train Spiral to expand abbreviations for you (changing every instance of *sp* to *Spiral*, for instance); abbreviations can be as long as 16 characters, expanding to 256 characters.

Spiral 1.0 hit a few snags in text editing. Pressing the spacebar at the end of a paragraph sometimes added a space and other times created a new line. Lines wrapped in unusual places, such as before a punctuation mark. Version 1.0.1 largely eliminates these problems.

Spiral uses Claris XTND translators to import and export documents. Although Spiral includes translators only for MacWrite and MacWrite II, the program can use any XTND translators it finds in the Claris folder inside the System Folder. Thus you can move your notes into or out of Microsoft Word, for instance, or T/Maker's WriteNow. In practice, the translators sometimes work and sometimes don't. Exported documents may have lines that flow off the edge of the page, or text with the wrong font sizes. Finally, because Spiral is page-oriented rather than document-oriented, there is no easy way to repaginate a document other than by cutting and pasting or by exporting the entire document and then importing it into a new notebook.

Overall, Spiral is a well-conceived application with an excellent feature set. Yes, I'd be happier if the program had automatic or manual repagination and if importing and exporting worked perfectly, but neither issue is serious enough to keep me from giving Spiral an enthusiastic thumbs-up. (TechWorks ships Spiral on a 1.44MB floppy disk but will exchange it for 800K disks, if needed.)—STEVEN A. SCHWARTZ

Structured Systems Software

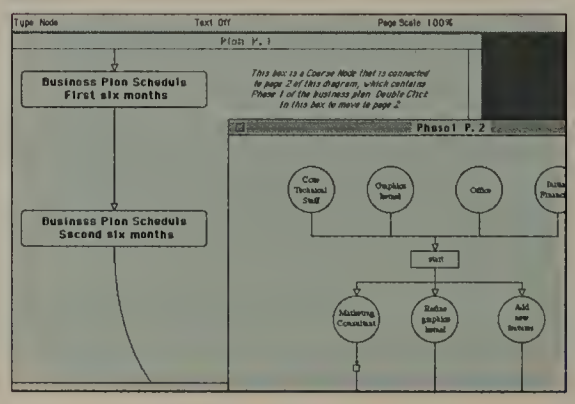
MetaDesign 3.0

PROS: Complete diagram-maker for complex, multipage structures; loads of convenience features for symbol manipulation. **CONS:** Needs more presentation-graphics features. **COMPANY:** Meta Software Corporation (617/576-6920). **REQUIRES:** Mac Plus; System 6.0.7. **LIST PRICE:** $250.

MW ★★★

BACK IN THE LATE PLEISTOCENE, when programmers communicated with apartment-size computers by means of punch cards coded in FORTRAN, every desk in a computer department had a flowchart template—a little green plastic sheet with cutouts for squares, triangles, ovals, and arrows. A good programmer would document code by drawing a flowchart for each small program segment and by drawing a chart of overall program flow. And if a programmer had fallen asleep in the tedium of redrawing pencil-and-paper charts, he or she might have dreamed of a program, far in the future, like MetaDesign.

MetaDesign is, however, more properly considered a diagraming tool for structured systems analysis (along the lines popularized by Edward Yourdon and Larry Constantine in their pioneering book *Structured Design* [Yourdon Press, 1978]) rather than a mere flowcharting aid. The range of MetaDesign's applications is indicated in its included samples. The program easily handles multipage business plans, electronic-circuit layouts, mapping, computer-science entity-relationship diagrams, and language parsers—all of which call for carefully documented logic and require easy ways to group and ungroup symbols in diagrams and to show relationships between symbols. That's exactly what MetaDesign provides. It gives you a collection of special node symbols and interconnector symbols and tools (with a reasonable amount of intelligence built in so that the program anticipates your intentions) for organizing your symbol-connector networks. What makes the program valuable is that the most frequently occurring tasks in diagram-making can usually be accomplished with a single command—the diagraming capabilities have been continually refined since an academic prototype version appeared about six years ago.



Strictly Business Used as a visual outliner, MetaDesign can produce multipage, multilevel diagrams in which you can jump between levels and pages with a mouse-click.

Although in version 3.0 MetaDesign's diagraming capabilities have been upgraded—Undo can now run 25 operations deep (the default is 5 operations), System 7 is supported (including Apple events and TrueType fonts), and files are compatible with the Windows version of MetaDesign—it's high time for more pizzazz. Since it's often used for presentations, both in slide shows and live on LCD-projection screens, MetaDesign now needs shaded backgrounds, symbol highlighting and shading, and better manipulation of imported color PICT files. These features, while trivial from the standpoint of structured systems analysis, have become standard in the simplest of presentation packages and would greatly extend MetaDesign's impact. MetaDesign is still champion at generating austere classic flowcharts, and you shouldn't draw a state-space diagram without it, but it's time to swipe a few flashy features from Aldus Persuasion or Microsoft PowerPoint.
—CHARLES SEITER

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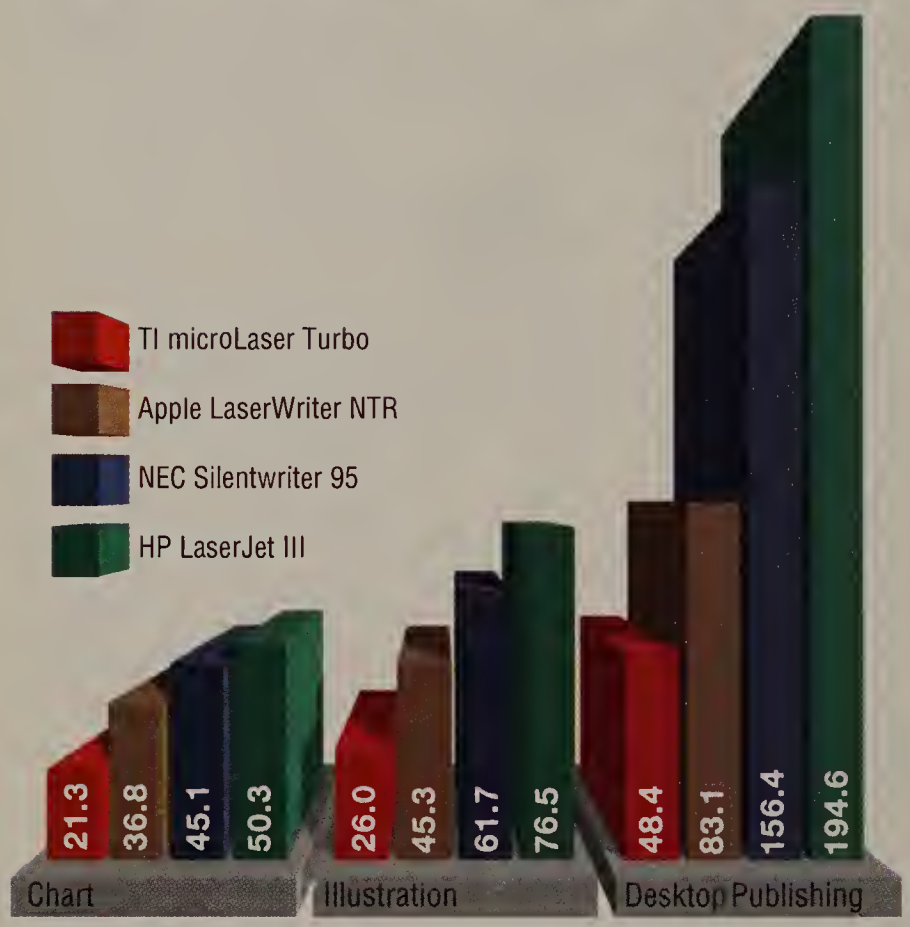

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Good for Your System

BY DAVID POGUE

I REALIZE IT'S A LITTLE UNORTHODOX for me to *begin* this column with the conclusion. But I can't risk your missing the point if you don't have time to read the whole column. Here it is: If you use System 7, get either SpeedyFinder7 or System 7 Pack.

They, like most of the other System 7 supplements reviewed here, are shareware. That means you can't call up MacConnection to order; you get shareware programs from user groups or dial-up modem services (like America Online) for free, and you send a small payment directly to the programmer if you like his work. (Yes, his. There are no female System 7 shareware programmers that I know of.)

The electronic bulletin boards are fairly creaking with System 7 add-ons. Here's the cream of the cream; these all work for System 7.0, 7.0.1, and 7.1.

SpeedyFinder7 1.5.4

SINCE YOU'RE PROBABLY WONDERING why I'm so hog-wild over this program, we may as well get this over with. SpeedyFinder7, a control panel, tweaks System 7 in 22 wonderful ways. As the name implies, most of these features speed up the Finder: copying files, emptying the Trash, opening windows, and so on. As far as I'm concerned, System 7's sole drawback is its mysterious sluggishness in performing these tasks; no wonder I wax ecstatic about something that copies files and empties the Trash twice as fast.

Many of SpeedyFinder7's features appear individually in other programs covered below. To save space, I'll refer to them by number (see "Finder Features"). SpeedyFinder7 provides features 1, 2, 3, 4, 6, 7, and 8. It also offers some exclusive features, including making your floppy disks show up with nice-looking color icons stamped with HD (for high density) or DD (for double density), or a strap (locked); trashing locked files without a peep; hiding the balloon help menu; turning balloon help on and off from the keyboard; and so on. One goody worth special mention: when you select the icon of an *alias* (a duplicate of a file, folder, or disk's icon that, when double-clicked, opens the original) and press the option key, the File menu's Find and Get Info commands change to say Find Original and Get Original Info. That makes a heckuva lot of sense; when was the last time you wanted info about an alias (instead of the actual file)?

Each feature has its own on/off check box. The best part is that author Victor Tan, a 23-year-old Australian med student, only wants $20 or a postcard—a *postcard*, for heaven's sakes—in exchange for all this bliss.

System 7 Pack 3.2

SYSTEM 7 PACK IS ALMOST IDENTICAL to SpeedyFinder7. It lacks several minor features of its rival, and one major one—Trash-emptying acceleration. But for System 7.1 users, it offers an important bonus: it makes Adobe Type Manager work with the new Fonts folder.

Otherwise, System 7 Pack's features 1, 3, 4, 6, 7, and 8 work great. It's not as pretty as its Australian rival, but you may prefer it for three reasons. First, you get tech support by phone directly from programmer Adam Stein—that's rare care, for shareware. Second, if you're not a modem or user-group buff, you can order this program by phone at 800/242-4775 or 713/524-6394. Third, when you mail in your $29.95, you get a password that unlocks certain additional options. Mystery-lover's hint: the password appears somewhere in this magazine.

System 7 Companion Pack 1.1

HERE'S ANOTHER ADAM STEIN CREation: a collection of six doodads that you can use (and pay for) individually. Of these, Super Alias may be the most useful. When you drop a passel of application icons onto Super Alias, you get an alias icon that, when double-clicked, launches all of those programs at once. That's handy when you're immersed in a project involving the same programs day after day.

Another unique Companion Pack morsel is an F-key manager, useful if (1) you know what an F-key is and (2) you have F-keys you want to install or renumber. Another module provides feature 5. Still another, QuickFinder, is a kind of mini-Finder, a launching-pad list of your favorite programs and files. The advantage of QuickFinder is that it can get by on 100K of memory. If you click on the Terminate Finder button, you quit the Finder, freeing up a hearty 200K of memory for your programs without giving up your ability to move, copy, rename, delete, or launch files.

These programs are not terribly polished-looking, and there's no balloon help, but the modules are as little as $5 apiece (or $19.95 for all). Or get them all for $10 if you also buy System 7 Pack.

Applicon 2.1

APPLE PROGRAMMER RICK HOLZGRAFE has written Applicon, a truly beautiful program with excellent balloon help and customization features, and he's giving it away free. Applicon places a palette of open-program icon tiles anywhere you want. Instead of using the awkward little application menu (on the System 7 menu bar) to switch between programs, a simple click on an Applicon icon does the trick (see "Applicon Can").

You might think that such a scheme would take up valuable screen real estate. Not so—Applicon modestly excuses itself to the background whenever another program is active. To bring the icon palette forward, you just point—not click—at a corner of the screen.

AppleEase 1.4

SYSTEM 7 USERS OFTEN PUT AN ALIAS of an item into the Apple Menu Items folder, so that it's listed in the Apple menu for easy access. But adding something to your Apple menu is a lot of effort: make an alias, delete the word *alias* from its name, open the System Folder, find the Apple Menu Items folder, put the alias inside, and then close all those folders. For that reason, there are more automatic make-an-alias-and-put-it-in-the-Apple-menu utilities (feature 5) than any other kind of shareware add-on.

Souping up System 7 with shareware

But it dawned on only one programmer that it should be just as easy to *remove* things.

continues

That's why AppleEase is great. Drop any file icon on it, and instantly that item is listed in your Apple menu. Choose that item from the menu while pressing the ⌘ key, and AppleEase removes the item from the menu, neatly dropping it at your feet (on the desktop). Too bad AppleEase doesn't handle folder and disk icons the same way. On the other hand, it's free. Thanks, Peter Kaplan.

Alias Director 3.2.1

IF YOUR LUST FOR ICON CONTROL IS unslaked after using AppleEase, there's only one thing for it: Alias Director, by Laurence Harris ($10). This program is the king of drag-and-drop. That is, you're supposed to drag disk, folder, or file icons on top of the Alias Director icon. Depending on which keys you're pressing at the time, Alias Director performs assorted alias-related stunts: creates an alias and puts it (all together now) in your Apple menu, creates an alias and puts it into a specified folder, opens the Get Info window for the original item, trashes an item and all associated aliases (that's a biggie, if you ask me), finds the original item (if you've drag-and-dropped an alias), makes an alias that has no icon, and so on.

But what really makes Alias Director is that you can specify which keys, pressed while drag-and-dropping, perform which function. Not just the usual ⌘-shift-option stuff—I mean any keys. You can hold down the T and A keys, for example, to trash all aliases. This wonderful mnemonic feature ought to spur the imaginations of commercial-software writers.

MenuChoice 1.5

PROGRAMS LIKE THIS MUST GIVE BIG Software Companies the willies. After all, Kerry Clendinning's $15 shareware control panel does precisely what some of the $100 add-ons (like HAM, from Inline Design, and HandOff, from Connectix) do: makes your Apple menu hierarchical. That is, any folder listed in your Apple menu sprouts a submenu showing its contents; folders within folders show sub-submenus; and so on. Think of it: you can open a particular control panel directly, without first opening the Control Panels folder. Or look inside any folder, or launch a file inside it, without having COWS (Cluttered, Overlapping Windows Syndrome).

As a hedge against letters to the editor, allow me to point out that MenuChoice, unlike the expensive programs, does not give the Chooser a submenu, nor does it track recently opened files and folders (except those launched from the Apple menu, which it forgets when you restart). Otherwise, I would say the world owes Kerry a toast (or at least a check for $15).

TrashAlias 1.1.1

IF YOU'RE ANYTHING OF A SHAREWARE-monger, you've probably heard about this nifty, free control panel by Maurice Volaski. When you throw anything into the Trash, TrashAlias also deletes any aliases you created from the trashed item. That's it. You'll never again see that painfully passive-voice System 7 error message "the original item could not be found."

Xtras for System 7

THIS COLLECTION OF ONE DOZEN SYSTEM 7 utilities is a lot like shareware: it's inexpensive and there's no phone number to call if something goes wrong. But it's not shareware; it's a book-and-disk combo compiled by author Sharon Zardetto Aker. She concedes that $24.95 is too expensive for a 100-page book (Addison-Wesley, 1992)—she proposes that you pretend you're paying for the software and getting the book for free.

Whatever your rationalization, you'll find some useful gadgets in this package. Eight are look-alikes of shareware favorites (including fully four that automate emptying the Trash in various ways). Two that don't exist in shareware form are standouts: there's a slick Scrapbook replacement that adds a table of contents, names for each Scrapbook page, and a Publish command (of publish-and-subscribe fame). There's also a hierarchical Apple-menu thing with more features than the $15 MenuChoice—you can rearrange the items in your Apple menu according to your zaniest whim, for example—but fewer than the $149 Now Utilities version. Anyway, if you like your add-ons served up in one handy bundle, this is a good way to go.

Finder Features

1. Speeds up Finder copying
2. Speeds up Empty Trash command
3. Edits or eliminates alias file-name suffix
4. Adds keyboard shortcuts for Finder commands
5. Adds an alias of a file to your Apple menu
6. Application substitution (launches Word when you double-click on a MacWrite file, for example)
7. Speeds up window opening
8. Changes or eliminates the delay between the time you click on an icon and the time the Mac lets you edit its name

Applicon Can At last, an escape from window madness. Move the cursor to a corner of your screen, and Applicon's tidy row of icons appears, making it easy to burrow directly to the program you want.

For PowerBooks Only

WHILE DIGGING AROUND ON THE electronic bulletin boards, I ran across some neat programs for PowerBooks: FindCursor 1.0 draws a thick can't-miss-it square around the cursor, wherever it may be, on your ghosty LCD screen (Mike Samuels, free); MyBattery 1.20 is a super-cool fuel gauge that shows your battery's charge status, including how much time you have left (Jeremy Kezer, $10); PowerSleep Fkey puts any PowerBook to sleep instantly, without leaving your program (requires Suitcase II, ResEdit, or System 7 Companion Pack to install; Urs Calibran, free).

The Upshot

OBVIOUSLY, THIS IS ALL GREAT STUFF. I'd even advise you to get all these programs, except that some of them would conflict. In any case, unless you're the rare individual who believes that life is too *long*, absolutely get SpeedyFinder7 or System 7 Pack. If you run more than one program at a time, test-drive Applicon.

Blast from the Past:

SEVERAL READERS ALERTED ME TO shareware disk-cataloging programs I somehow missed in January's *Desktop Critic*. One mentioned Loodle ($10, Josh and Nick Franco), a charming disk-reader and label printer, which I tried and loved. Another suggested Disk Librarian ($20, Little Bit). But the former doesn't show you a list of files, and the latter doesn't print labels. The search goes on. **m**

Contributing editor DAVID POGUE, author of the best-selling *Macs for Dummies* (IDG Books Worldwide, 1992), is still looking for a control panel that empties the actual trash can in his kitchen.

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- ITC GARAMOND CONDENSED $75 — light, light italic, book, book italic, bold, bold italic
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- GOLD RUSH (ATF) $15
- GOUDY (ATF) $50 — regular, italic, bold, bold italic
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- ITC GOUDY SANS $50 — book, book italic, bold, bold italic
- GRAPHIK (IC) $25 — regular, shadow
- NALLMARKE (IC) $50 — light, light oblique, black, black oblique
- NALLMARKE CONDENSED (IC) $100 — light, light oblique, book, book oblique, bold, bold oblique, black, black oblique
- HOBO (ATF) $15
- ITC ISBELL $50 — book, book italic, bold, bold italic
- IVY LEAGUE (VGC) $25 — regular, open
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- ITC KORINNA $50 — regular, kursiv, bold, bold kursiv, outline
- LEMONADE (IC) $25 — regular, bold
- ITC LSC MANHATTAN $15
- ITC LUBALIN GRAPH $125 — extra light, extra light oblique, book, book oblique, medium, medium oblique, demi, demi oblique, bold, bold oblique
- ITC MACHINE $25 — regular, bold
- MICRO TECHNIC 2 (IC) $35 — condensed, extended, extended bold, condensed outline, extended outline, extended bold outline
- MINI PICS CLASSIC (IC) $15
- MISTRAL (OLIVE) $15
- ITC MODERN NO.216 $75 — light, light italic, bold, bold italic, heavy, heavy italic
- MURRAY HILL (ATF) $25 — regular, bold
- NEULAND $15
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- NEW YORKER (IC) $25 — regular, engraved
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New Products

The Latest Macintosh Releases

EDITED BY CAROLYN BICKFORD

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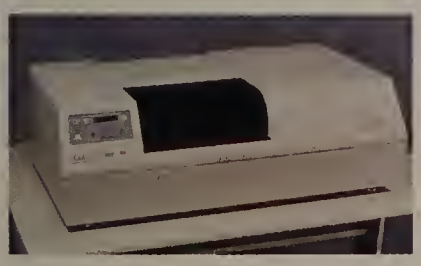
HARDWARE

APS Epson MO
High-density magneto-optical drive stores up to 128MB on each magneto-optical cartridge and has 38ms access speed. Ships with one cartridge. $1199; internal version for Quadra 900 or 950, $1099. APS, 816/478-8300, 800/235-2752; fax 816/478-4596.

ColorGetter II and ColorGetter II Pro
Drum-based scanners scan 4064 lines per linear inch, according to company. Can scan transparencies, slides and reflective materials, color negatives, and black-and-white photographs. ColorGetter II has 10-by-10-inch format. ColorGetter II Pro has 11-by-15-inch format. Both ship with ColorRight 2.0 scanning software. 4MB min. memory. ColorGetter II $42,450; ColorGetter II Pro $48,450. Optronics, 508/256-4511; fax 508/256-1872.



ColorGetter II and ColorGetter II Pro

DataShield S100 Surge Suppressor
Surge suppressor features multiple-component circuitry that stops surges, spikes, line noise, and interference. Also includes hard drive protection feature with low-voltage alarm and flashing indicator that warns of substandard voltage before hard drive damage can occur. $105. Tripp Lite, 312/329-1777; fax 312/644-6505.

DoveFax+V
Fax/data modem turns Mac into desktop voice, data, and fax communications system. Stores telephone voice messages in voice mailbox, and logs call information such as caller ID and call duration. Also sends and receives faxes at 9600 bps, transmits and receives data at 2400 bps, and switches back to automatic answering mode when complete. $449. Dove Computer, 919/343-5600, 800/849-3297; fax 919/251-9441.

DoveFax+V

FlexScan F340iW
15-inch color monitor displays 1024 by 768 pixels at 76Hz noninterlaced refresh rate, according to company. Automatic power switch turns power on or off in response to computer signals. Compatible with Mac II video boards. $899. Nanao USA Corp., 310/325-5202, 800/800-5202; fax 310/530-1679.

Model 7150
Large-format laser printer features 300-dpi or 400-dpi resolution, 4MB of RAM expandable to 20MB, over 60 internal fonts, and 32-character LED display. Accepts letter-size (8½ by 11 inch) and ledger-size (11 by 17 inch) paper. Two-bin $4395; three-bin $4645. Genicom Corp., 703/949-1000, 800/443-6426; fax 703/949-1392.

MultiRoute
Router handles up to eight channels simultaneously and extends LocalTalk networks to Ethernet environment. Product features auto configuration; simultaneous handling of EtherTalk Phase 1 and Phase 2; and interoperability with AppleTalk routers, network bridges, and repeaters. $4300. Syscom, 408/432-8153, 800/624-8007; fax 408/432-9892.

Mustek Paragon 1200
Cross-platform flatbed scanner with internal SCSI interface scans legal-size (8½-by-14-inch) documents in 24-bit color at 1200 dpi. Also scans in 256-shade gray-scale, half-tone, and black-and-white. $1995. Mustek, 714/833-7740, 800/366-4620; fax 714/833-7813.

Perfector
Universal Power Supply has 14MHz CPU with firmware that filters and conditions incoming power and manages charge/discharge cycling of batteries. Also has LED front panel. DBB-6 has a 600 volt-ampere power rating; DBB-9 has a 900 volt-ampere power rating. DBB-6 $1399.95; DBB-9 $1599.95. DSK Power Products, 801/224-4828; fax 801/224-5872.

PowerAccess 96/144 and 96/96
Internal fax modems fit PowerBook 100, 140, 145, and 170 and require no separate battery or power source. PowerAccess 96/96 communicates at 9600 bps; PowerAccess 96/144 communicates at 14,400 bps. Both send and receive faxes at 9600 bps. Hayes and Group 3 compatible. 96/96 $549; 96/144 $649. Dtronix, 408/982-9667; fax 408/253-3400.

Print Bridge
A PostScript-language controller for large-format electrostatic plotters and printers, which performs automatic sensing and switching among parallel, serial, and LocalTalk interfaces. The controller has 35 standard fonts and supports Type 1 fonts. $9995. Calcomp, 714/821-2549, 800/932-1212; fax 714/821-2714.

Print Bridge

PrintPartner 10W
Cross-platform laser printer prints at 10 pages per minute and has 300-dpi resolution, according to company. Printer features 35 embedded TrueType fonts; serial, parallel, and AppleTalk ports; and universal paper tray that feeds envelopes, overhead transparencies, and labels. $2450. Fujitsu Computer Products, 408/432-6333, 800/626-4686; fax 408/894-1706.

ScanPlus Color 6000
Single-pass color scanner outputs at 600 dpi; scans images from 2 by 3½ inches up to 8½ by 14 inches; can scan in black-and-white, gray-scale, and color. 2MB min. memory. $780. Plustek USA, 408/980-5183, 800/676-1119; fax 408/980-5184.

Spectra-Com 1496 Pocket Fax/Modem
Fax modem sends and receives data at 14,400 bps and sends and receives fax transmissions at 9600 bps. Includes cables, AC adapter, battery, carrying pouch, and STF fax software. Five-year warranty. $349. Bay Connection, 408/270-8070; fax 408/270-0698.

Spectra-Com 1496 Pocket Fax/Modem

Voice Messenger
Electronic voice mail downloads voice messages to mail server, which then deposits messages into E-mail systems with voice capability, such as CE Software's QuickMail or Microsoft Mail, or into Cypress Software's PhonePro mail. Requires Macintosh II and System 7. 4MB min. memory. $950. Cypress Research Corp., 408/752-2700; fax 408/752-2735.

SOFTWARE

Ad Lib 1.0
MacApp 3.0–compatible ViewEdit replacement; features include selection, movement, alignment, and duplication of multiple view objects; fast access using an Attributes palette to view-editing functions; automatic maintenance of string-list and text-style resources; direct and indirect access to subviews and subview edit windows; absolute and relative alignment grids; and support for all MacApp 3.0 view attributes. 2MB min. memory. $199. MADA, 408/253-2765; fax 408/253-2767.

Amusing Ourselves to Death & Brave New World
This Expanded Book for the PowerBook combines two books: Aldous Huxley's vision of a bleak, hedonistic, and drugged-out future and Neil Postman's opinion that the brave new world is already upon us. 2MB min. memory. $19.95. The Voyager Company, 310/451-1383, 800/446-2001; fax 310/394-2156.

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Arabesque Patterns & Clip Art
This collection provides more than 100 Arabic and Islamic clip art images and patterns in EPS and DXF format. 2MB min. memory. $49. Arabesque Software Company, 415/495-8655; fax 415/495-2951.

CyberSounds for the Macintosh
Collection of more than 80 original sounds by artist Steve Jones ships with shareware SoundMaster program. 1MB min. memory. $19.95. Gargoyle Mechanique Laboratory, 212/505-8991; fax 212/674-3371.

Dasher Authoring System
Foreign-language teachers type in instructions, questions, and answers; after administering test, the program analyzes students' wrong answers and shows where correct answer differs. Teachers can create exercises in German, English, Spanish, French, Italian, Portuguese, and Latin. Variety of exercise types available, including story exercises, substitutions, sentence combining, multiple choice, transformations, dictation, translation, and synthetics. 1MB min. memory. $150.

Dasher Authoring System

Conduit, 319/335-4100, 800/365-9774; no fax.

Diet for a New America
An examination of America's dependence on animals for food by John Robbins. In Expanded Book for the PowerBook format, Diet for a New America allows readers to mark passages or take notes electronically. 2MB min. memory. $19.95. The Voyager Company, 310/451-1383, 800/446-2001; fax 310/394-2156.

DriveShare
Control panel utility enables users to share removable drives over an AppleTalk network. Accesses SyQuest, Bernoulli, and many optical and CD ROM drives. Supports mixed-system networks, LocalTalk, and Ethernet. Enables removable drive to act as server. Ships with Drive7Rem, a removable device driver. 1MB min. memory. Five-user pack $199.95; ten-user pack $299.95. Casa Blanca Works, 415/461-2227; fax 415/461-2249.

Expert Office Design
Office-design program has more than 100 objects in library, such as desks, chairs, filing cabinets, conference tables, computers, and electrical symbols; supports multiple layers for design organization; prints in color or black-and-white; rotates objects either 90 degrees or in 1-degree increments; and imports or exports objects or layouts in PICT format. 2MB min. memory. $49.95. Expert Software, 305/567-9990, 800/759-2562; fax 305/443-0786.

Expert Office Design

FaxPro Access/4D
Allows 4D developers to custom-design applications for multiuser fax system. Lets users specify options, such as cover-page graphics and text, fax resolution, and the ability to specify local or remote conversion of fax documents. Requires FaxPro 2.0 or later and ACIUS's 4th Dimension 2.0.10 or later. 1MB min. memory. $49. Cypress Research Corp., 408/752-2700; fax 408/752-2735.

Ferrari Grand Prix
Color version of Ferrari driving simulation game provides control options such as a choice between player or computer control of shifting, braking, and car setup; digitized sounds; multiple viewing angles; and the ability to race against another player on another Mac. 2MB min. memory. $69.95. Bullseye Software, 702/831-2523; fax 702/267-2054.

Fluent Laser Fonts Library 2
Collection of 120 typefaces from 48 families in PostScript Type 1 and TrueType formats has added flourishes, ligatures, and substitute characters for stylistic variation. Standard character sets have extra characters for Western European and Scandinavian languages and for special purposes, such as math symbols, basic fractions, and copyright, trademark, and registered symbols. $179.95. Casady & Greene, 408/484-9228, 800/359-4920; fax 408/484-9218.

GraVu
System extension provides automatic gray-scale dithering on any Mac with Color QuickDraw. Allows users of 16-gray-level displays to see renditions of 256-gray-level images, and users of 256-color displays can see simulations of 16-, 24-, and 32-bit color images. 1MB min. memory. $25. PaperClip Products, 918/749-7417, 800/497-5508; fax 918/749-7417, 800/497-5508.

Just Joking
Collection of more than 2800 jokes, one-liners, and humorous quotations drawn from comedians ranging from classic to current. Users can search by comedian or by topic and can add new topics and jokes. Easy-search with HyperCard Player, included. Comes with whoopee cushion and mustache glasses. 1MB min. memory. $49. WordStar International, 415/382-8000, 800/523-3520; fax 415/382-4958.

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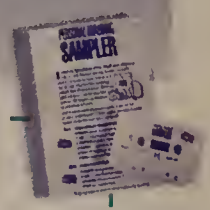

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cludes over 130 drawings of families, people, flowers, sports, food, school, holidays, and nature in EPS and TIFF formats. Also includes three handwriting fonts (PostScript Type 1) by children ages 5 through 8 in crayon, paint, and marker textures. 1MB min. memory. $129. DS Design, 914/268-8394, 800/745-4037; fax 914/268-9577.

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Over 60 full-color images for fairy tales and children's stories: mystical doors, elves, mushrooms, clowns, witches, ghosts, giraffes, elephants, and rhinos. All images in PICT format. 1MB min. memory. $74.95. Nordic Software, 402/488-5086; fax 402/488-2914.

Lemmings for the Mac
Player guides up to 100 lemmings at once as they climb, parachute, block, dig, and explode their way through 120 increasingly difficult levels; includes 21 multitrack lemming tunes. 2MB min. memory. $59.99. Psygnosis, 617/731-3553, 800/438-7794; fax 617/731-8379.

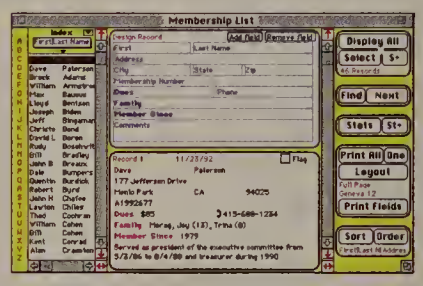
MacClaimChek
Keeps track of health insurance claims. After user enters individual and health plan information, program identifies what is covered by which plan and registers different types of claims, such as pharmacy, surgery, inpatient, outpatient, and preventive maintenance. Handles individual and multiple claimants and multiple health plans. Generates reports for insurance clarification and tax purposes. 1MB min. memory. $44.99 plus $5 s/h. Te Corp., 603/726-7177; fax 603/726-8818.

MacDepreciation
Program that enables farmers to record, calculate, review, and evaluate depreciation schedules. Uses the modified accelerated cost recovery system (MACRS) and allows the selection of either 150 percent declining balance or straight line methods for the half-year convention. Depreciation schedule is created for each new item entered with item's depreciation length in years. Comes with ProVue's Panorama Direct. 2MB min. memory. $390. MacEssentials, 605/886-2553, 800/658-3899; fax 605/886-2739.

MacLogin Script
Allows Macintosh users to access the log-on script on Novell Netware version 2.15 or higher. Recognizes standard system and personal log-on commands; also features four unique commands that allow user to display a PICT resource at the Mac workstation during log-on, play a sound, and synchronize the Mac clock to network time; and allow the system network manager to launch applications on the Mac during log-on. 1MB min. memory. For networks with five or fewer file servers $169; unlimited site license $369. Wholly Mac Software, 702/878-3316; no fax.

MacSchedule
Accounting program designed to enable farmers to record, review, and retrieve information on profit or loss from farming; patterned after IRS Schedule F Form 1040. One form enters or reviews income; another form enters or reviews expenses. Category items and their totals, such as Feed Purchased and Sales of Livestock, are available for review as well. Comes with ProVue's Panorama Direct. 1MB min. memory. $390. MacEssentials, 605/886-2553, 800/658-3899; fax 605/886-2739.

MyDataBase
A flat-file database that allows users to add, subtract, multiply, or divide fields within a record and includes statistical-computation capabilities that allow users to summarize information across all records. Imports and exports comma-, tab-, or quote-delimited files. 1MB min. memory. $24.95. MySoftware Company, 415/325-9372, 800/325-3508; fax 415/325-3106.



MyDataBase

NetVantage II
Network design, simulation, and optimization tool provides packet-level simulation and high-speed performance modeling of AppleTalk networks. 4MB min. memory. Up to 100 nodes $995; unlimited nodes $4895. EclecTec Software, 408/461-2040, 800/669-3855; fax 408/461-2044.

Prograph IAC Goodies Disk
Documentation, classes, and examples for writing applications in Prograph that make use of System 7's interapplication communications (IAC) capabilities. 2MB min. memory. $49. TGS Systems, 902/455-4446, 800/565-1978; fax 902/455-2246.

QuickCode
Locates CPT codes for physicians and billing services; can code for several procedures in one sitting. Manual includes information on CPT coding. 4MB min. memory. $495. Dr. P's Software, 800/879-2339; fax 417/736-3002.

QuickFee
Program calculates anesthesia fees for various insurers, helping avoid overcharges and undercharges. Besides program information, manual includes information about anesthesia fee calcu-

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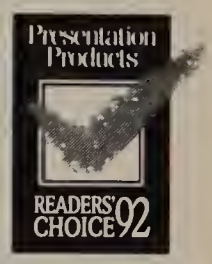

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lation. 2MB min. memory. $225. Dr. P's Software, 800/879-2339; fax 417/736-3002.

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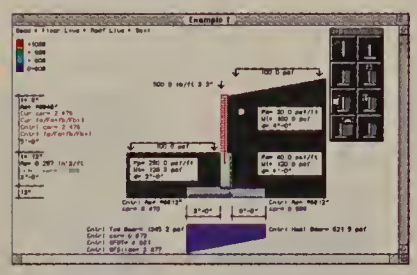

RetainWall

The Sales Automation Selector
A directory of sales software that allows the user to select among available products by answering an online questionnaire, selecting several specific qualities of desired software, or selecting individually by browsing specifics of software packages. 1MB min. memory. $89.95. Bentz & Associates, 717/755-2627; no fax.

Savage Inequalities
A review of U.S. educational system combines research, firsthand observation, and interviews with students and teachers by Jonathan Kozol, a former teacher. In Expanded Book for the PowerBook format. 2MB min. memory. $19.95. The Voyager Company, 310/451-1383, 800/446-2001; fax 310/394-2156.

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Garage-shop-management program handles up to 35 jobs per repair order; allows for an unlimited number of customers and vehicles; prints estimates and allows for unlimited changes; updates inventory; allows multiple pricing for any part; and tells users if a car has prior recommendations or scheduled maintenance due. 1MB min. memory. $3495. Integra Management Systems, 707/833-1823; fax 707/833-1823.

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Database of thermochemical and physical properties of inorganic and organic compounds includes data for more than 6000 solids, 2000 liquids, and 2000 gases. Solids database includes information on crystal structure, density, thermal expansion, elastic moduli, and thermal conductivity. Liquids and gases databases include information on density, viscosity, thermal conductivity, and surface energy. Also includes thermodynamic data and vapor pressures for more than 4000 compounds. 1MB min. memory. $395. ES Microware, 513/738-4773; fax 513/738-4407.

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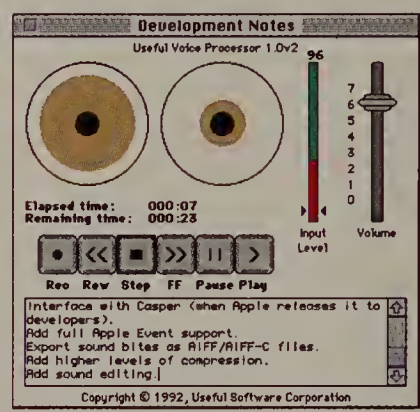

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Database of models' portfolios has nearly 20,000 photographs of more than 2000 models. User can search through database by 30 different model attributes and statistics; compare option lets user view several portfolios at once. Model agency information included on each screen. Requires Mac II family or Quadra and 20MB free drive space. New CD ROM issued monthly. 5MB min. memory. $695 per year. Showcase Communications Network, 212/989-5708; fax 212/989-8049.

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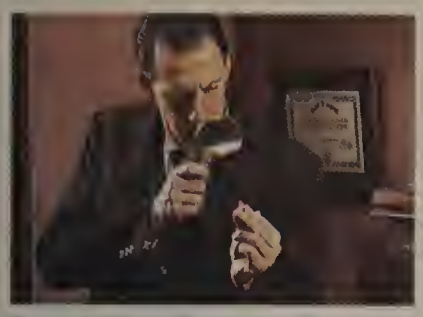

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EasyVue Mouse Pad
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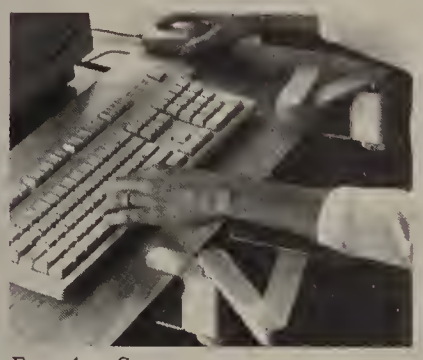
Ergo Arm Supports
Arm supports let user move arms while maintaining neutral wrist position. Metal ball bearings allow arms to pivot to a reach of 12 inches, holding clamps and padded arm cushions. $250 per pair. BackSaver Products, 508/429-5940, 800/251-2225; fax 508/429-8698, 800/443-9609.



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PowerLock
Steel security device locks PowerBook closed; unlocks with a key. Wire anchor cable allows user to lock the PowerBook to a fixed object. $69.95. Corporate Management Group, 512/329-8220, 800/880-9980; fax 512/329-5532.

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Earthquake safety fasteners clip computer equipment to desk or table; release instantly for moving or servicing equipment. Each clip is capable of restraining weights up to 50 pounds, according to company. Kits consist of six fasteners and two straps. For LC $14.95; for IIsi $16.95; for IIci $17.95. Fastening Solutions, 818/994-6398, 800/232-7836; fax 818/997-1371.

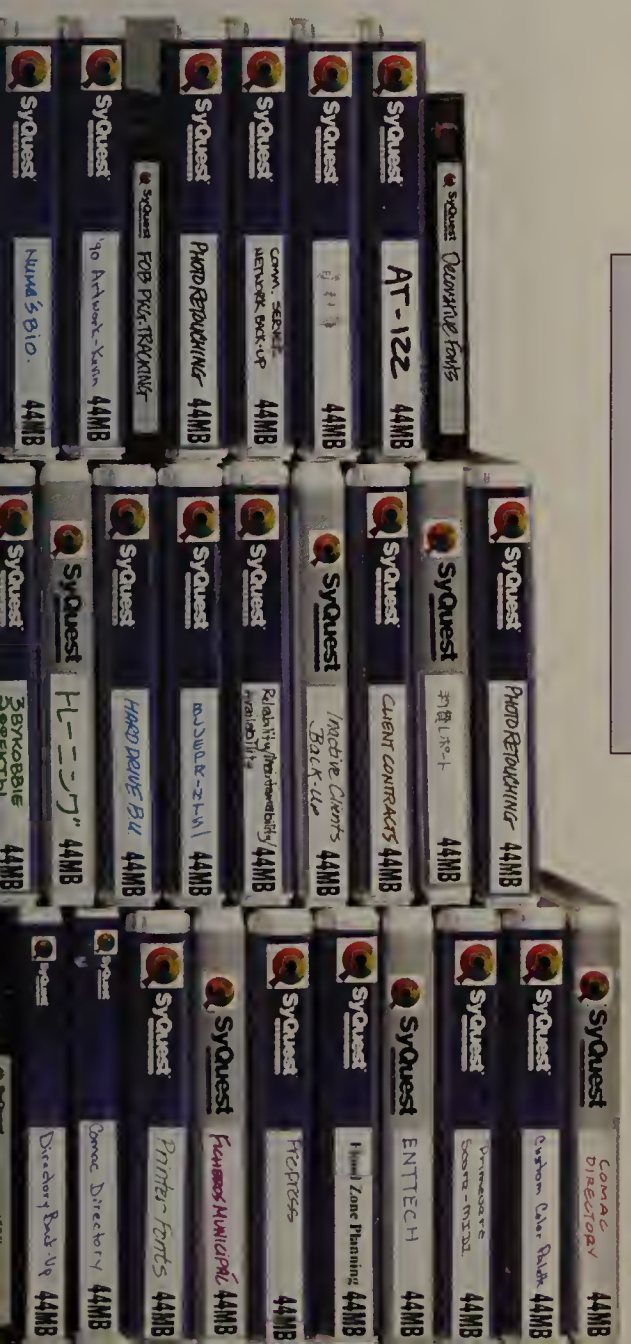
BOOKS

Electronic Design and Publishing: Business Practices
Covers print-production guidelines in ethics, ownership, communication, policies, and procedures. Topics are discussed from the viewpoint of the client, the creative groups, and the print group. Covers project planning, writing proposals, estimates and quotations, ownership of material, ownership of software applications, and copyrights and confidentiality. Written by Liane Sebastian. $19.95. Allworth Press, 212/777-8395, 800/247-6553; fax 212/777-8261.

Macintosh and You: The Basics
Tutorial introduces Macintosh Finder interface and provides introductions to Works, Excel, PageMaker, Word, MacWrite, and FileMaker Pro. Includes floppy disk with tutorial files. Written by Patricia Sullivan. 1MB min. memory. $18.95. Franklin, Beedle & Associates, 503/682-7668; fax 503/682-7638.

The Macintosh Multimedia Sourcebook
Lists more than 400 products for use on the Mac when producing or presenting multimedia applications. Listings include software, computer hardware, video and sound equipment and accessories, and CD ROMs and accessories. Edited by Trysh Brown-Freeborg. $29.95 plus $3 s/h. TBF Publications, 314/351-1729; fax 314/351-1729. m

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107. *Macworld* reserves the right to edit all product announcements.



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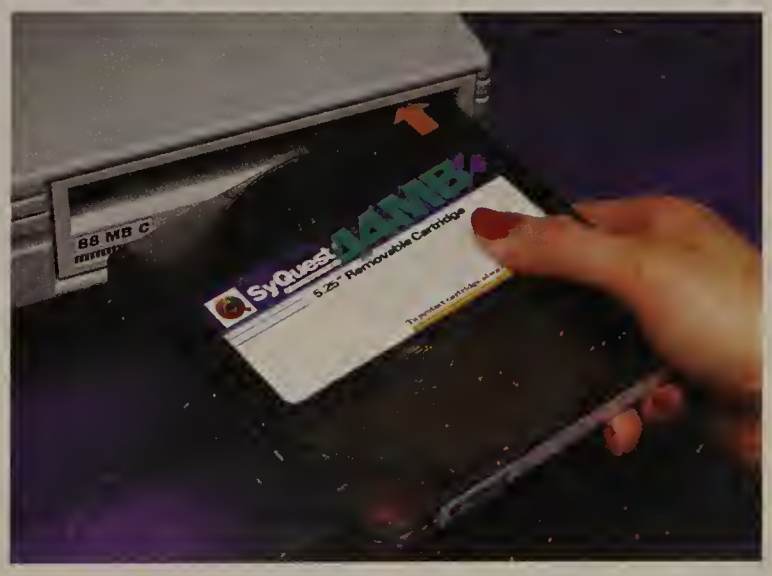

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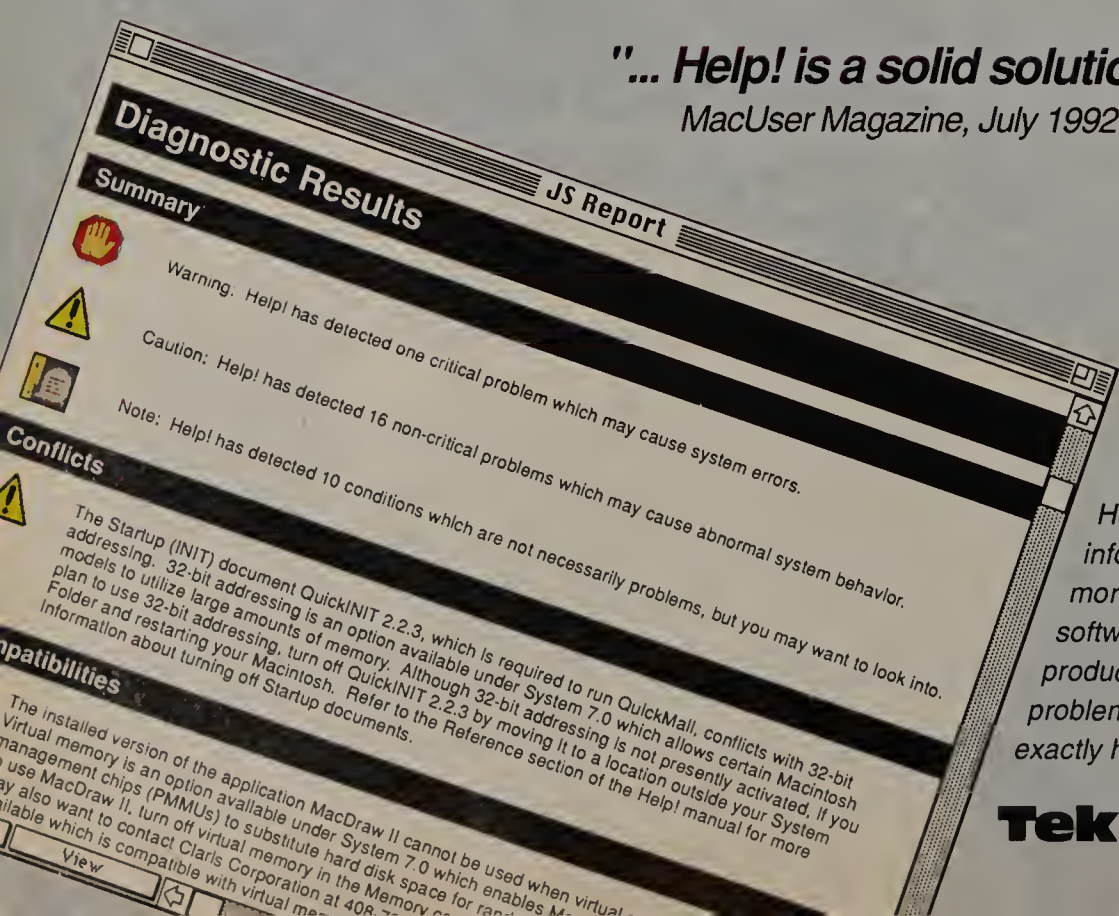

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Circle 18 on reader service card

Questions and Tips from Macworld Readers

BY LON POOLE

AS A TIP LAST OCTOBER SUGGESTED, you can make custom folder icons with a color painting application—superimposing an application or document icon on an ordinary folder icon—for use with the Finder's Get Info command in System 7. When selecting the custom icon in the painting application, you must take care to select a rectangular area no larger than 32 by 32 pixels (the maximum size of an icon). If you select a larger area, including lots of white space around your custom icon, for example, the Finder shrinks the selection to 32 by 32 when you paste it into the folder's Get Info window, and your custom icon ends up shrunken. If you select an area smaller than 32 by 32, the Finder centers the selection in the folder's icon space and the custom icon will not line up horizontally with a plain folder icon, which is flush with the bottom of its icon space.

You can avoid this rigmarole by doing what David S. Johnson of Durham, North Carolina, does. He uses the freeware utility Folder Icon Maker by Gregory M. Robbins. You just drag a great-looking application or document icon to Icon Maker, and presto, it creates a new folder with a small version of that icon superimposed on it. You can get Icon Maker from user groups such as BCS Mac (617/864-1700).

Straight Scoop on Partitioning

TO SET THE RECORD STRAIGHT, MacTools Deluxe 2.0 from Central Point Software (800/445-2110 or 503/690-8088) tracks deleted files, as described in a tip last November, but it cannot partition your hard drive. Partitioning enables you to eliminate the pointless tracking of many temporary files that system software and applications create and delete automatically. Although 2.0 does not include disk partitioning, older versions do. With 2.0, Central Point decided to focus strictly on data recovery and protection. You can partition hard drives with most disk-formatting software, including Hard Disk ToolKit from FWB (415/474-8055), Silverlining from La Cie (800/999-0143 or 503/691-0771), and Drive7 from Casa Blanca Works (415/461-2227). MacTools' main competition, Norton Utilities for Macintosh from Symantec (800/441-7234 or 408/253-9600), also includes partitioning capabilities in version 2.0, the latest at this writing.

Simpler Automatic Entries

SEVERAL READERS HAVE WRITTEN TO point out a simpler method than the one presented in a tip last November for making FileMaker Pro 2.0 or 1.0 (or even FileMaker II) automatically enter a new value in the records you are currently browsing: simply use the Replace command. T. John Kowal of Houston, Texas, observes that you can even make conditional assignments by first finding a specific set of records with the Find command and then applying the Replace command to that set. For example, you might add a field to your database of clients identifying which ones are VIPs, and initially bestow that status on clients whose business with you exceeds $100,000 per year.

Memory Still Missing

Q. In last November's *Quick Tips* you explained how quitting only some open programs may fragment memory, making the largest unused block of memory smaller than the total unused memory, but it doesn't explain memory use just after I start up my Mac IIsi. At that time the About This Macintosh command reports that the system software uses 3120K and the largest unused block is 6475K (see "Partial Memory"). The sum of those two numbers is 9595K, much less than the IIsi's 12,288K total memory. (My IIsi has 5MB of RAM, and I set System 7's virtual memory to 12MB.) Can you explain the discrepancy?

Don Carver
Raleigh, North Carolina

A. You have encountered another type of memory fragmentation that occurs only when you're using System 7's virtual memory with 32-bit addressing turned off. Under those circumstances memory is fragmented at the 8MB point, where memory space is reserved for the Mac's ROM. As a result, the largest possible unused block of memory is 8MB (8192K) minus the memory size of the part of the system software that can't be swapped to the virtual memory storage file on your hard drive.

With 32-bit addressing off, System 7's virtual memory extends memory by reclaiming memory space reserved for NuBus slots. All Macs that can use System 7's virtual memory have memory space reserved for six NuBus slots even if they actually have fewer than six slots. Each unused NuBus slot space yields 1MB of virtual memory, up to a maximum of 6MB. With no slots in use, virtual memory can extend total memory to 14MB. Subtract 1MB if you use built-in video on your Mac (for example, on a Classic II, SE/30, LC II, IIsi, IIci, Ivx, IIvi, Quadra, Performa, or PowerBook). Think of built-in video as a fake NuBus slot with a board in it.

Word 5 file recovery, simplifying Trash removal, tracking loans in ClarisWorks, and more

Memory beyond 8MB is a contiguous block unless you place NuBus boards haphazardly or use built-in video on a Mac IIci. You can avoid fragmenting memory above 8MB on most Mac models that have multiple slots by placing all NuBus boards consecutively in the rightmost slots. On the IIci and Quadra 700, place NuBus boards in the leftmost slots. You can't avoid memory fragmentation if you use the built-in video on a Mac IIci because it uses a middle NuBus slot space. Built-in video is not a problem on other Mac models because they don't use a middle NuBus slot space for it.

To eliminate fragmentation of extended memory on

continues

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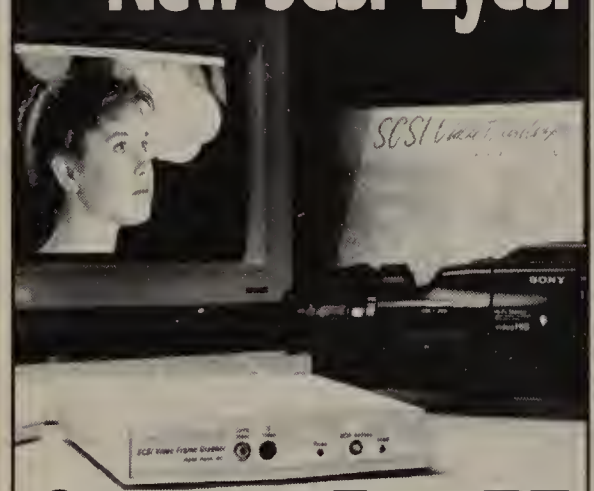

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all models, turn on 32-bit addressing. Then the ROM and the NuBus slots use memory space above 1 gigabyte (1024MB), and virtual memory doesn't use NuBus slot space to extend memory.

Amortization Table

Q. How can I make a loan amortization table with ClarisWorks on my Macintosh LC?

Bob Kurzen
Waynesville, North Carolina

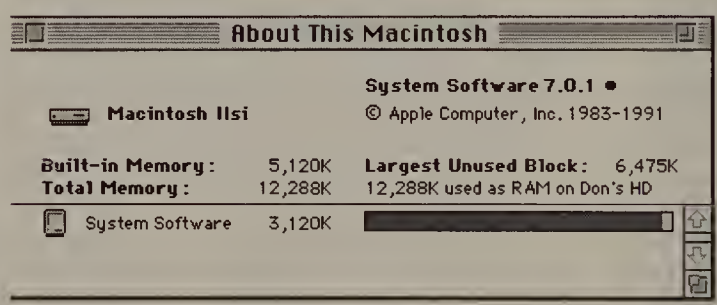
A. The spreadsheet shown in "Loan Amortization Table" calculates the regular payment after you enter the principal, annual interest rate, length of the loan in years, and number of payments per year. You also enter the date of the first payment. Then for each payment the spreadsheet tabulates the payment date, beginning balance, interest paid, principal paid, ending balance, and cumulative interest. To create this spreadsheet, follow these steps.

1. Format columns and cells as follows:
   - Column B—use general number format with center alignment.
   - Column C—choose the style of date you prefer.
   - Columns D, E, F, G, and H—fixed decimal numbers with a precision of 2.
   - D4—currency with a precision of 0.
   - D5—percent with a precision of 2.
   - D6 and D7—general numbers.
   - D8—any style of date.
   - D9—currency with a precision of 2.
   - D10—general number.

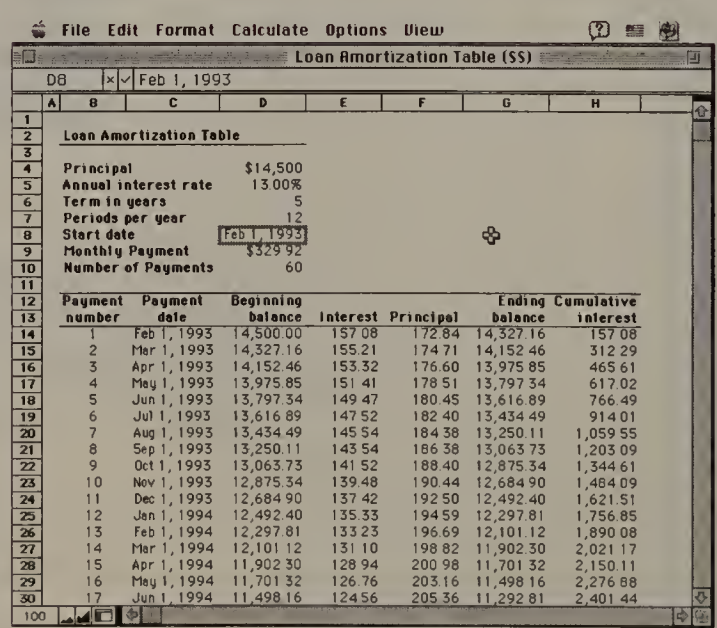
2. Enter formulas as follows:
   - D9=-PMT(D5/D7,D10,D4)
   - D10=D6*D7
   - B14=1
   - C14=D8
   - D14=D4
   - E14=$D$5/$D$7*D14
   - F14=IF($D$10>=B14,$D$9-E14,0)
   - G14=D14-F14
   - H14=E14
   - B15=1+B14
   - C15=IF($D$10>=B15, C14+CHOOSE(MONTH(C14),31, IF(YEAR(C14)/4<>INT(YEAR(C14)/4),28,29),31,30,31,30,31,31,30,31,30,31), "—")
   - D15=IF($D$10>=B15,G14,0)
   - E15=$D$5/$D$7*D15
   - F15=IF($D$10>=B15,$D$9-E15,0)
   - G15=D15-F15
   - H15=H14+E15

3. Fill down between cells B15 and H15 through the rows for which you want to have loan details tabulated. It doesn't matter if you fill down more rows than the number of payments the loan requires because the IF functions in rows C, D, and E stop the tabulations at the row containing the last payment. The formula for column C calculates payment dates by adding the number of days in the month to the date of the previous payment. This formula takes leap years into account (for the years between 1904 and 2199).

4. Enter values (principal, interest rate, term, payment periods per year, and start date) in cells D4, D5, D6, D7, and D8.



Partial Memory Right after starting up with System 7's virtual memory on, System Software plus Largest Unused Block add up to less than Total Memory if 32-bit addressing is turned off. In this case, Largest Unused Block is just a fragment of the total unused memory.



Loan Amortization Table

Principal	$14,500
Annual interest rate	13.00%
Term in years	5
Periods per year	12
Start date	Feb 1, 1993
Monthly Payment	$329.92
Number of Payments	60

Payment number	Payment date	Beginning balance	Interest	Principal	Ending balance	Cumulative interest
1	Feb 1, 1993	14,500.00	157.08	172.84	14,327.16	157.08
2	Mar 1, 1993	14,327.16	155.21	174.71	14,152.46	312.29
3	Apr 1, 1993	14,152.46	153.32	176.60	13,975.85	465.61
4	May 1, 1993	13,975.85	151.41	178.51	13,797.34	617.02
5	Jun 1, 1993	13,797.34	149.47	180.45	13,616.89	766.49
6	Jul 1, 1993	13,616.89	147.52	182.40	13,434.49	914.01
7	Aug 1, 1993	13,434.49	145.54	184.38	13,250.11	1,059.55
8	Sep 1, 1993	13,250.11	143.54	186.38	13,063.73	1,203.09
9	Oct 1, 1993	13,063.73	141.52	188.40	12,875.34	1,344.61
10	Nov 1, 1993	12,875.34	139.48	190.44	12,684.90	1,484.09
11	Dec 1, 1993	12,684.90	137.42	192.50	12,492.40	1,621.51
12	Jan 1, 1994	12,492.40	135.33	194.59	12,297.81	1,756.85
13	Feb 1, 1994	12,297.81	133.23	196.69	12,101.12	1,890.08
14	Mar 1, 1994	12,101.12	131.10	198.82	11,902.30	2,021.17
15	Apr 1, 1994	11,902.30	128.94	200.98	11,701.32	2,150.11
16	May 1, 1994	11,701.32	126.76	203.16	11,498.16	2,276.88
17	Jun 1, 1994	11,498.16	124.56	205.36	11,292.81	2,401.44

Loan Amortization Table You enter the particulars of a loan and this spreadsheet calculates the payment amount and tabulates the loan's amortization, payment by payment.

What Scripts Are

Q. I write scripts for HyperCard and have seen the term *scripting* used with other applications. Is it the same? If not, what does the term mean?

Galen W. Ewing
Las Vegas, New Mexico

continues

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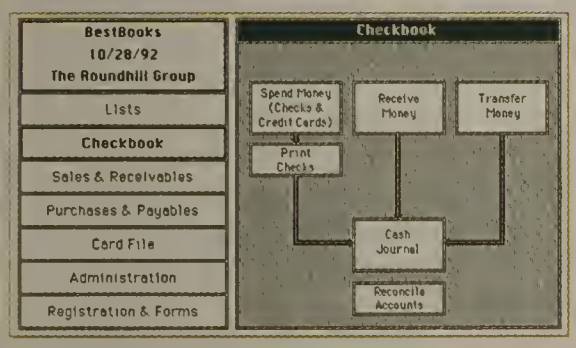

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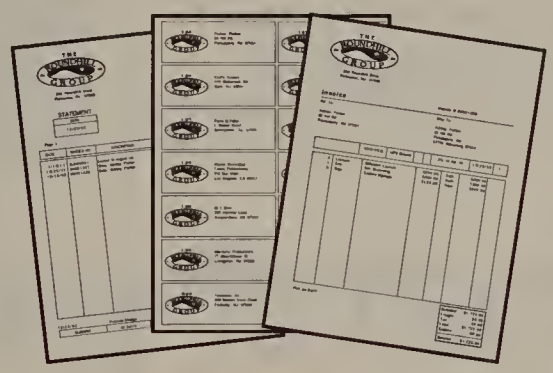

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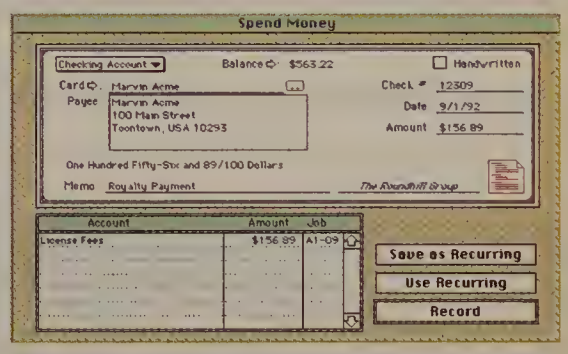

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A. Just as a HyperCard script instructs the computer to perform a task in a predictable, repeatable manner, so do the scripts and macros created in other applications. Although various types of scripts and macros have the same basic objective—automated control of the computer—they are not interchangeable. You can't write a Claris HyperCard script and have Resolve or Microsoft Excel execute it because each scriptable application has its own scripting or macro language.

Regardless of their individual vocabularies and syntaxes, most scripting and macro languages use similar types of instructions. They also share common programming principles; these include using variables and controlling the order in which instructions are performed. If you know how to write scripts or macros in one language, you can learn a second language more quickly and easily than you learned the first.

Some scripting and macro languages do not fit the common mold. For example, all FileMaker Pro scripts consist solely of steps that transform a database from one state (such as sorted by name) to another state (such as sorted by zip code) without the use of variables and control instructions. The macro utility QuicKeys (from CE Software, 800/523-7638 or 515/224-1995) simply mimics the actions of a computer user by clicking buttons, choosing menu commands, typing, and so on.

Not only can you script individual applications, but you can also control a number of applications with scripting and macro tools that send and receive messages called Apple events. Apple introduced Apple events with System 7 as a means of interapplication communication (IAC). Most applications that have been released or upgraded since System 7 came out recognize at least the basic four Apple events—open application, open document, print document, and quit application. Beyond these four basic Apple-events messages, Apple recommends that application programs understand another two dozen messages. They encompass actions and objects almost all programs have in common, such as close, save, undo, redo, cut, copy, and paste. Some programs with related capabilities recognize additional sets of Apple-events messages. For example, word processors may understand messages about text manipulation, and draw programs may understand messages about graphics manipulation. Program developers can also define personal messages that only their own applications can understand.

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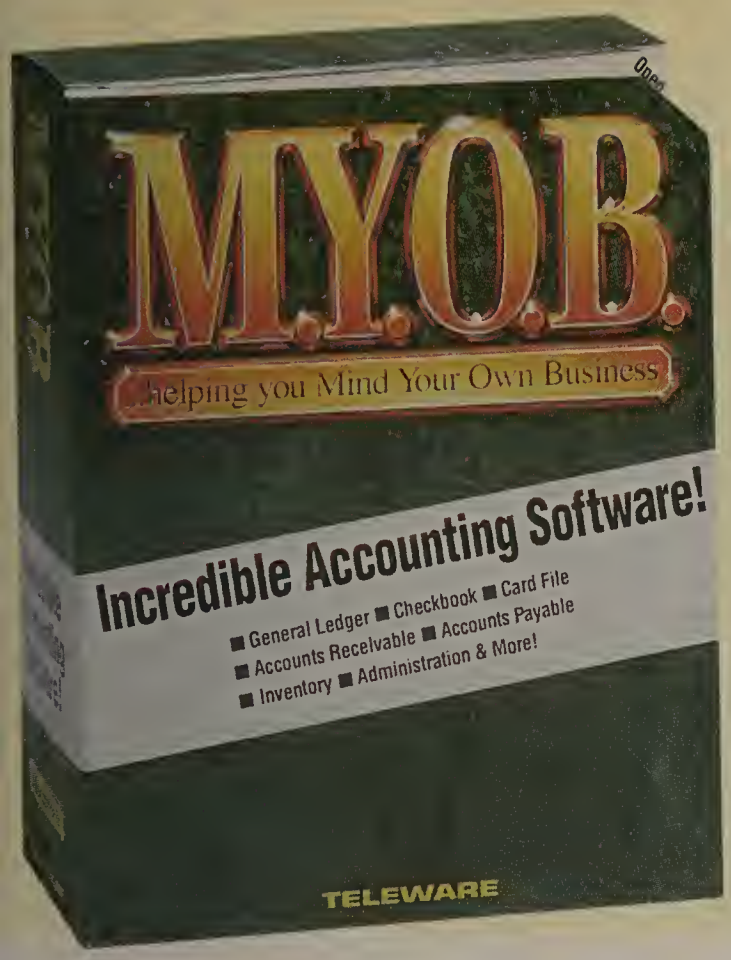

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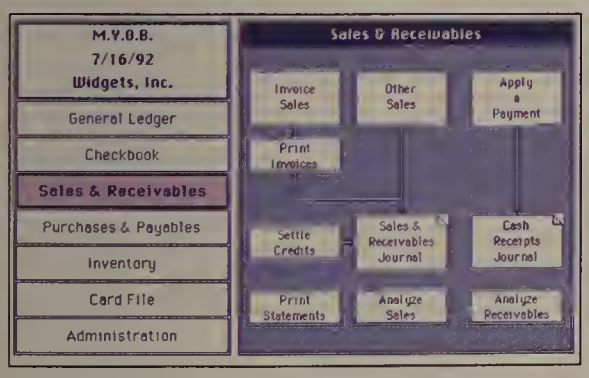

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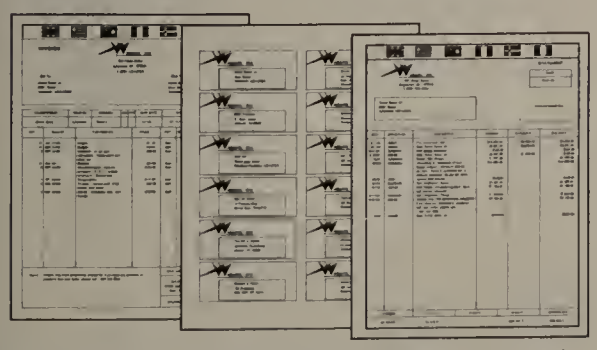

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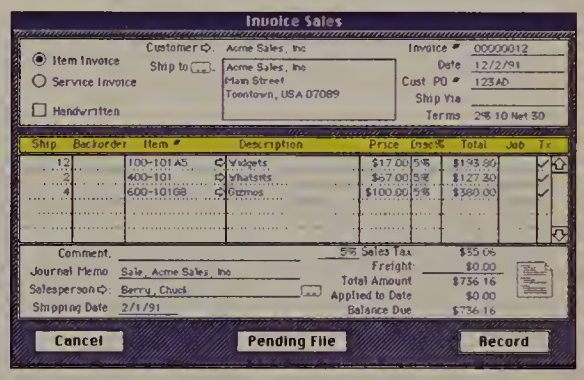

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HyperCard 2.1 scripts and QuicKeys 2.5 macros can control other programs by sending Apple events. Frontier from UserLand (800/845-1772 or 415/325-5700) is a tool for creating and editing systemwide scripts, and Simple Software (415/381-2650) has a point-and-click systemwide scripting tool called Control Tower. Apple also has its own universal scripting language, AppleScript, under development.

Damage Recovery

TIP Microsoft Word's Find File command, which allows you to search your hard drive from within Word using a variety of search criteria, is a great addition to version 5. But you can also use Find File to recover information from damaged Word files.

When I saved a ClarisWorks file in Word format and then tried to open the converted file in Word, my system locked up. I tried opening the converted file with ClarisWorks but was informed that I had an unexpected end-of-file error. So I had Word's Find File command find the converted file. Although Word reported a file error message, the full text appeared in the Contents section of the Find command's dialog box. I selected all the text, copied it to the Clipboard, pasted it into a new file, and saved that without error.

Neil Parker
Summerland, British Columbia, Canada

Whenever you convert from one file type to another, it's always a good idea to use a different file name. If anything goes wrong, you can still open the original, unconverted file.—L.P.

Personal LaserWriter LS RAM

TIP When printing complex legal-size documents with my Personal LaserWriter LS, I had to settle for a huge margin—about one inch. I investigated upgrading the printer's memory, and after several Mac dealers told me it couldn't be done (despite the manual saying it can), I finally found the scoop. You simply drop four 256K DRAM chips (100ns or faster) into the appropriate sockets and move a well-marked jumper. DRAM chips are not SIMMs, just single chips that cost $4 to $8 each. Simple enough to do at home, the installation takes an LS from 0.5MB to 1MB. Dealers don't do the upgrade because Apple doesn't list a part number for DRAM chips.

Before I could decide whether to buy the extra memory, however, I got the newest printer driver software for the LS, version 7.2. Once I had installed the new driver, I was able to get a quarter-inch margin on legal paper by choosing the

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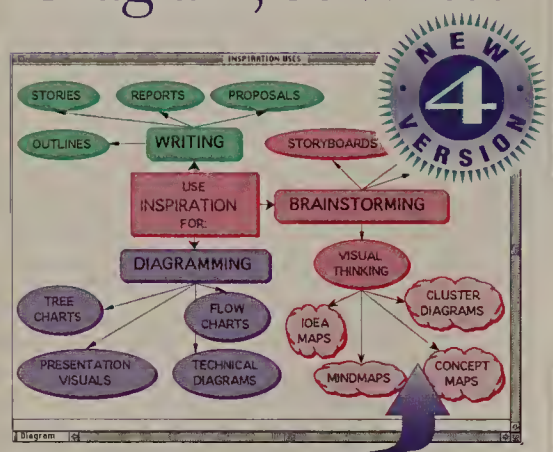

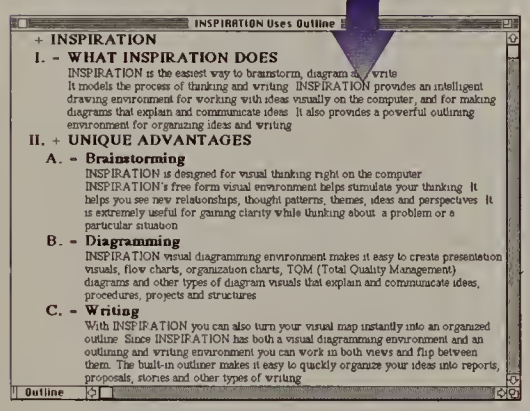

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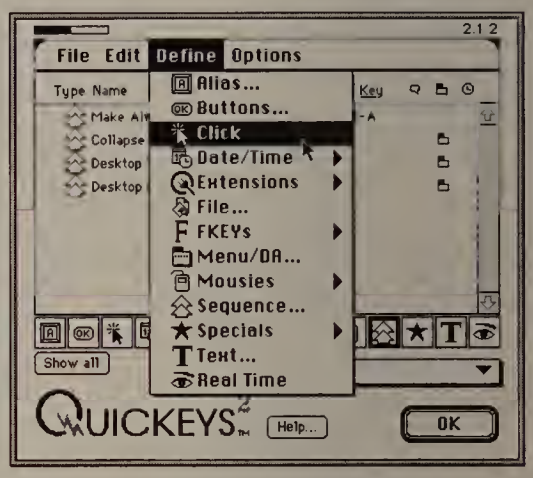
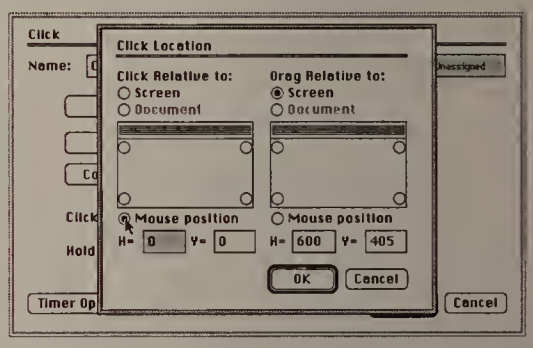
Trash Pickup

TIP: QuicKeys users, are you tired of dragging things to the Trash with the mouse? A simple macro can do it for you. Scott Alan Gruby of Claremont, California, submitted a procedure, based on information from Dave Olmsted of CE Software and enumerated below, that defines the macro. With the macro defined, you can put items in the Trash by selecting them wherever they may be, leaving the pointer over any one of them, and pressing the keystroke you designated to activate the macro.



1. Open the QuicKeys editor and choose Click from QuicKeys' Define menu. When the QuicKeys window disappears and a microphone icon flashes over the Apple menu icon, click on the Trash. The Click editing window appears. In it click the Click button to bring up the Click Location editing window.



2. In the Click Location editing window, select Screen as the Drag Relative To option, and then select Mouse for the Click Relative To option. This instructs QuicKeys to click wherever the pointer is and drag from there to the coordinates of the Trash (which you recorded when you clicked in step 1). Click the OK button to return to the Click editing window.

3. Back in the Click editing window, type a name for the macro and a keystroke for activating it (for example, ⌘-T). Click OK to dismiss the Click editing window, and click OK again to dismiss QuicKeys.

Page Setup command, clicking the Options button, and turning on the Larger Print Area option. Anyone who has a Personal LaserWriter LS should by all means get the newest driver software. Version 7.2 is much faster and more capable than the old 7.0—it's almost like getting a new printer.

I still wonder whether doing the memory upgrade would get me anything—more fonts in a document, more complex graphics, faster printing, larger paper sizes.

Bryan Walls
Hunstville, Alabama

Apple doesn't have a RAM upgrade kit for the LS, but dealers can get the chips from Apple Service (part number 333-0129) and from independent memory vendors. Apple says the memory upgrade does not improve printing performance but does eliminate alerts advising you that there is insufficient memory to print your documents. These alerts indicate that your documents are too complex or large to fit in the standard 0.5MB of memory. Version 7.2 of the Personal LaserWriter LS software comes with the System 7.1 Update Kit, which in the United States you can purchase by phone directly from Apple (800/769-2775). You may also be able to get the printer software from an Apple dealer, who can get it from AppleLink.—L.P. m

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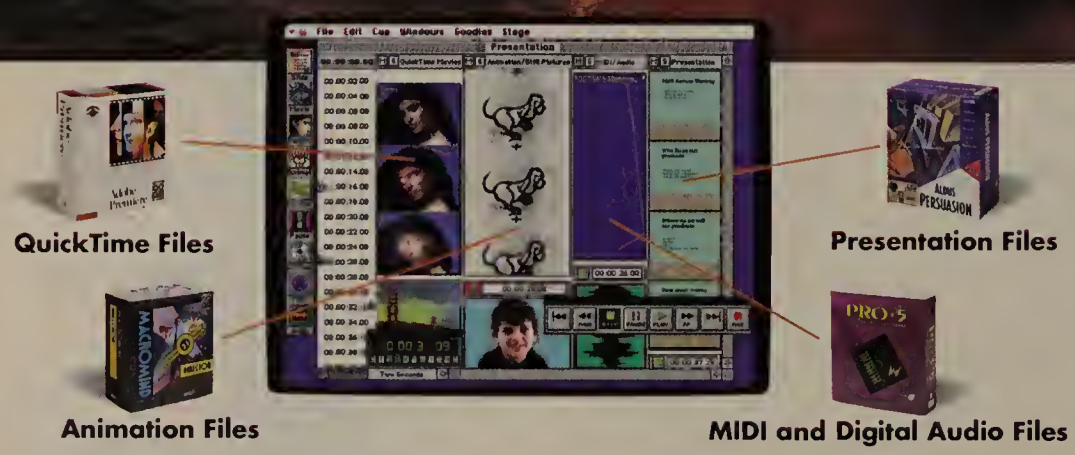

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Word Processing with Style Sheets

BY JIM HEID

WRITING IS ONLY PART of what you do with a word processor. The other part is formatting—choosing fonts, adjusting margins and line spacing, setting tabs. It's the manual labor that can make you feel more like a typesetter than a writer.

What's frustrating about formatting is that so much of it is repetitive: 12-point Helvetica headings, 10-point Times body text, and back again. Maybe you also have an extra line space above the headings, or you center the headings over justified body text. Switching between these formats as you create a document means trip after trip to the menu bar and through the same old dialog boxes.

Or does it? Three of today's most popular word processors—Microsoft Word 5.0 and 5.1, WordPerfect 2.1, and T/Maker's WriteNow 3.0—provide features that let you automate repetitive formatting chores by creating *style sheets*, or *styles* for short. A style is a collection of formatting settings—font, point size, line spacing, tabs, margins, borders, and more—stored under a single name, such as *heading* or *body text*. If you create a style for those centered 12-point bold Helvetica headings, you can turn selected text into a heading with one mouse-click or keystroke. Styles let you leap tall formatting tasks in a single bound.

Besides allowing you to quickly apply complex formats, styles make reformatting easier. If you decide your headings would look better in 14-point ITC Bookman italic, just change the description of the heading style, and all headings change instantly—no need to scroll through the document and manually change each one. You can even tell your word processor to switch from one style to another when you end a paragraph.

All this automation has other benefits. Styles help ensure that a long document has a consistent appearance, even if you redesign it in midstream. You can format text with your word processor and then bring that text—and its styles—into a desktop publishing program such as Aldus PageMaker or QuarkXPress. If you need to reformat text after importing it, you can redefine the appropriate styles right there.

As with any customizing task, defining styles is one of those jobs where some upfront work simplifies life in the long run. So why do so many people ignore their program's style features? One reason may be the initial setup time—even a minute of advance planning is too much for some folks. But another reason may be that styles seem complicated. They aren't, especially if you start with the basics.

The Elements of Styles

A KEY TO UNDERSTANDING HOW STYLES work is to remember the two basic kinds of formatting you can perform in any word processor: *character-level* and *paragraph-level formatting*. When you change a word from, say, bold to italic, you're formatting at the character level. When you change indents, tabs, or line spacing, you're formatting at the paragraph level. And to a word processor, a paragraph is anything that is surrounded by carriage returns (see "Paragraphs Illustrated").

The style features in Microsoft Word, WordPerfect, and WriteNow operate on the paragraph level; in these programs, when you define a style it stores not only font and type size, but also line spacing, indents, tabs, and other formatting attributes that can apply to paragraphs. WriteNow also provides character-level styles that store only font, size, and type-style information. I'll spotlight some advantages of this approach later.

The easiest way to create a style in any of these programs is to format a paragraph as desired, including any special margin indents, tabs, or line spacing settings, then define a style that holds the formatting. Be sure to select the text whose formatting you want to store.

How to: Word If the ruler isn't visible, choose Ruler from the View menu. Click once within the ruler's style pop-up menu, then type a name for the new style (see "Creating a Style"). Press the return key and click on Define to confirm the new style.

How to: WordPerfect Choose Styles from the Layout menu and then choose New. Type a name of up to 20 characters for the new style. You can also type an optional description to remind you of the style's purpose. The Preserve pop-up menu lets you choose to store only character formatting (the Attributes option—the default), only ruler settings (the Formatting option), or both. Choose the option you want, then click on New.

How to: WriteNow Choose New from the Custom menu's Paragraph Styles submenu. (You can also choose New Paragraph Style from the paragraph style pop-up menu at the bottom of WriteNow's document window; this pop-up appears only if you've already defined at least one style for the document.) Type a name for the new style and click on OK.

Applying a Style

ONCE YOU DEFINE A STYLE, YOU CAN apply it to existing text or to new text that you type. Applying a style is no different from choosing a font or some other formatting command: if you're reformatting existing text, select the text first; if you're typing new text, place the insertion point where you want the text to appear and then apply the style.

Use these formatting tips to turn out stylish-looking documents in record time

How to: Word Choose the desired style from the ruler's style pop-up. If you don't want to use the ruler, you can apply a style from the keyboard: press ⌘-shift-S, type part or all of the style's name, and press return.

How to: WordPerfect Choose the desired style from the Layout menu's Styles submenu.

How to: WriteNow Choose the style you want from the Paragraph Styles pop-up menu.

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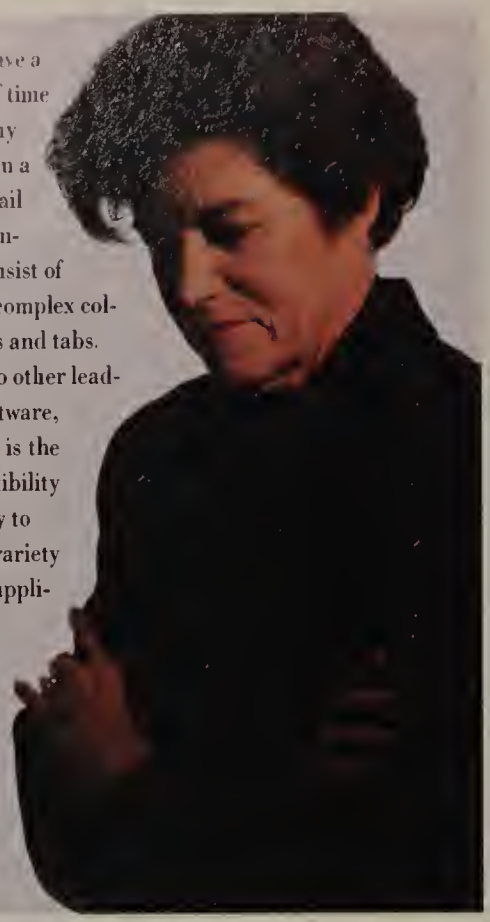

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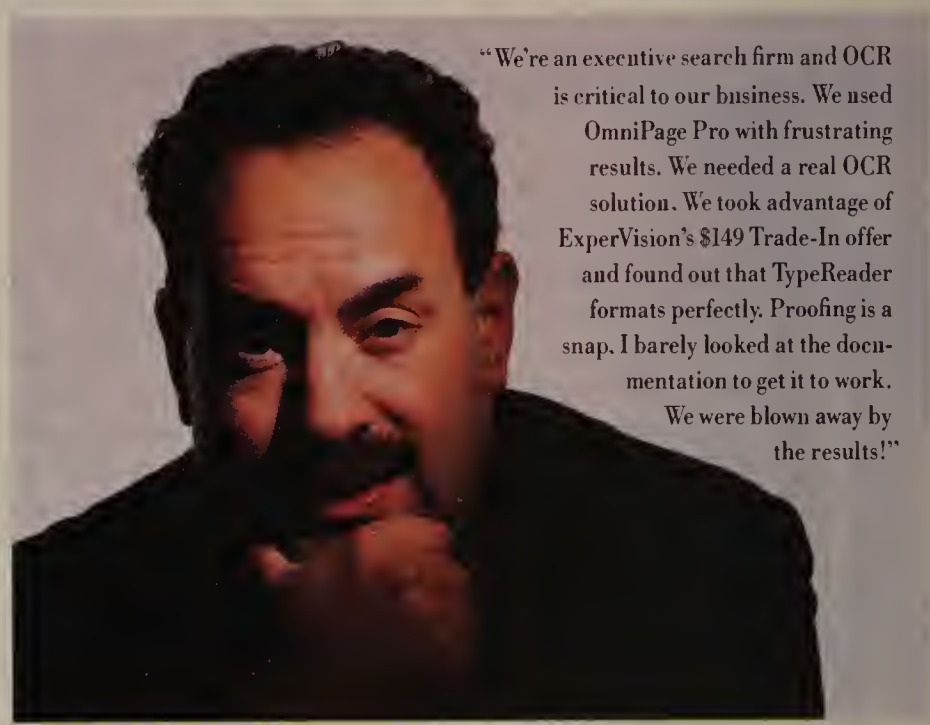

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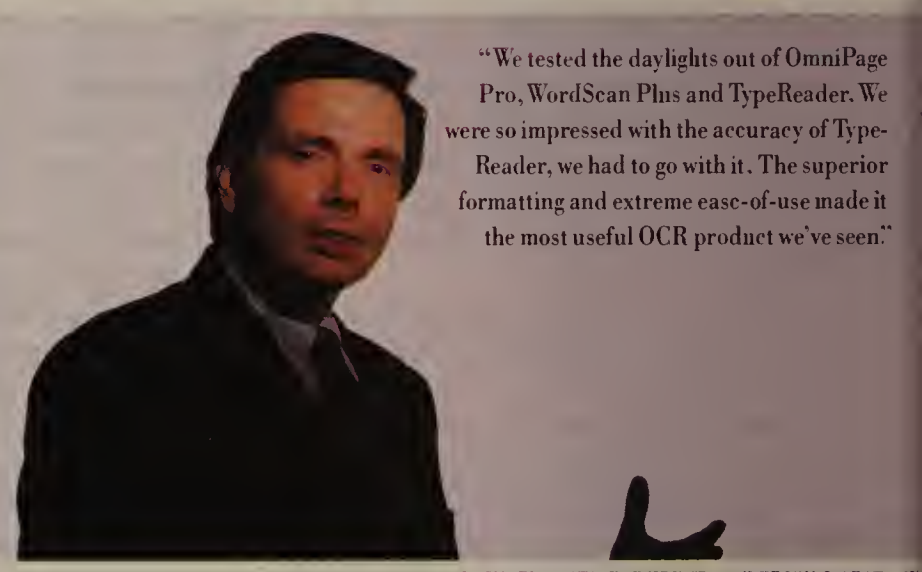

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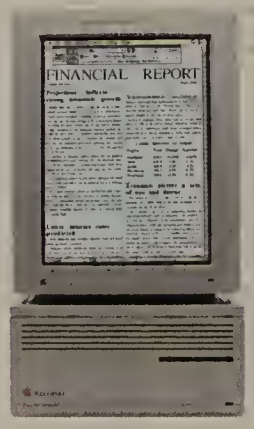

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Easier Ways to Apply Styles

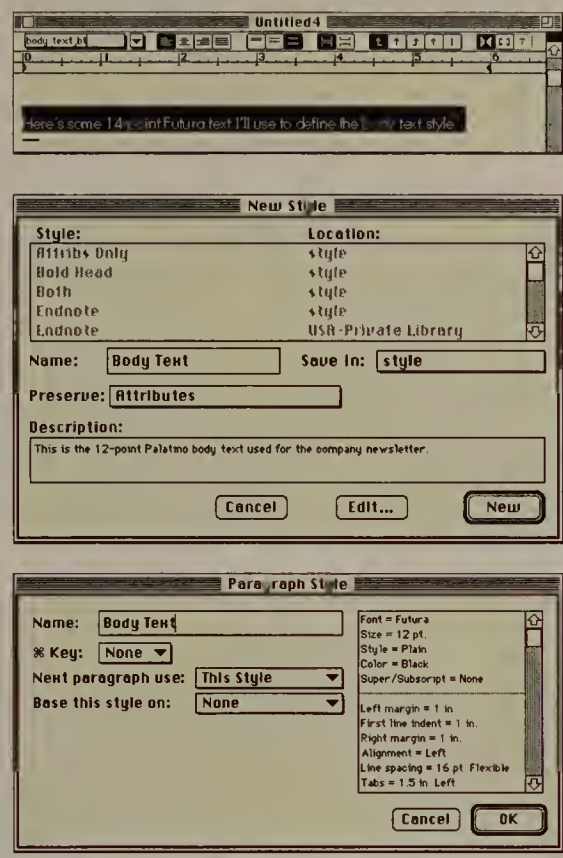
CREATE A KEYBOARD SHORTCUT FOR A style or add it to a menu.

How to: Word Word lets you define ⌘-key shortcuts for styles and add styles to the Work menu. To create a keyboard shortcut, be sure the ruler is visible, then press ⌘-option-+ (the plus sign on the number keypad, not the one next to the delete key; if you don't have a number keypad, choose Commands from the Tools menu, select the Assign to Key command, and click on Do It). The mouse pointer turns into a ⌘ symbol. Choose a style from the ruler's style pop-up and Word asks you to type the keystroke you want to use to summon that style. Type the keystroke, using the ⌘ key along with any other desired modifier keys (control, option, shift). If that keystroke is already assigned to a different command, Word asks if you want to reassign it. Click on OK if you do; otherwise, cancel and think up a different keystroke.

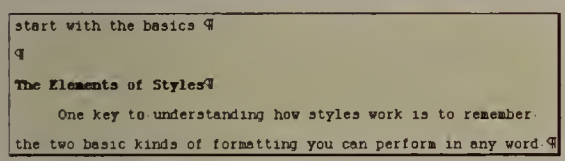
To add a style to Word's Work menu, press ⌘-option-+ (the plus key next to the delete key), then choose the desired style from the ruler's style pop-up.

How to: WordPerfect WordPerfect automatically adds styles to its Styles submenu. To create a keyboard shortcut for a style, choose Edit from the Styles submenu and select the desired style. In the Keystrokes area, click on the Assign button and then type the keystroke. If you don't want the style to appear in the Styles submenu, uncheck the Show Style in Menu box. When you've finished defining shortcuts, click on Done.

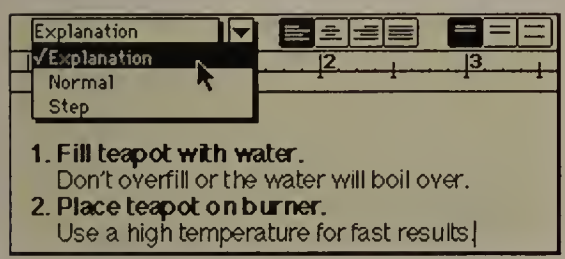
How to: WriteNow WriteNow automatically lists styles in its Paragraph Styles submenu. WriteNow doesn't let you build your own keystroke sequence as a style shortcut, but provides 11 predefined ⌘-*key* sequences to choose from. To assign one of these shortcuts to a style, choose Edit/Delete Style from the Custom menu, and double-click on the desired style. Choose a key combination from the ⌘ Key pop-up menu and click on OK.



Creating a Style Top: Click in the Word ruler's style box and then type a name for the style. Type a comma to add an optional abbreviation—handy for applying style names with the keyboard. Middle: WordPerfect's New Style dialog box lets you add an optional description of the style's purpose or revision history. Bottom: WriteNow's Paragraph Style dialog box lists the new styles formatting attributes.



Paragraphs Illustrated To a word processor, any text surrounded by carriage returns (generated by pressing the return key) is a paragraph. A carriage return on a blank line by itself is also considered a paragraph. There are four paragraphs here.



Next Style These instructions use two styles: Step and Explanation. They are linked to each other with the next-style option—pressing return after typing a paragraph formatted with the Step style automatically switches to the Explanation style.

Next Style: Instant Style Switching

NORMALLY, WHEN YOU BEGIN A NEW paragraph, your word processor applies the current style to the new paragraph. But what if you frequently switch formatting from one paragraph to the next? In a manual, you might alternate between bold step-by-step instructions and plain-text explanations of each step (see "Next Style"). In a newsletter or book, you might switch from headings in one font to body text in another. You can automatically switch to a different style when you end a paragraph by defining a *next style* (called a *linked* style in WordPerfect).

Not only can you define a next style for a style that you've already created, but in all three programs, you can also specify a next style when creating a new style. In either case, before defining a next style, first create the style that you'll be switching to—you can't specify a next style if the next style doesn't yet exist.

How to: Word Choose Style from the Format menu and then select the style

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for which you want to define a next style. Use the Next Style pop-up menu to choose the style you want to switch to. Click on Define, then on Close. If you want to override the next style, press ⌘-return to start a new paragraph. When you press ⌘-return, Word applies the current style to the new paragraph instead of switching to the next style.

How to: WordPerfect Choose Edit from the Styles submenu (Layout menu), then select the style for which you want to define a next style. Choose the next style from the Link To pop-up menu, then click on Done. Unlike Word and WriteNow, WordPerfect doesn't switch to the next style when you press return. To call up the next style, end a paragraph by pressing the enter key instead.

How to: WriteNow Choose Edit/Delete Style from the Custom menu, then double-click on the style for which you want to define a next style. Choose the desired next style from the Next Paragraph Use pop-up menu, then click on OK. To override the next style when ending a paragraph, press option-return.

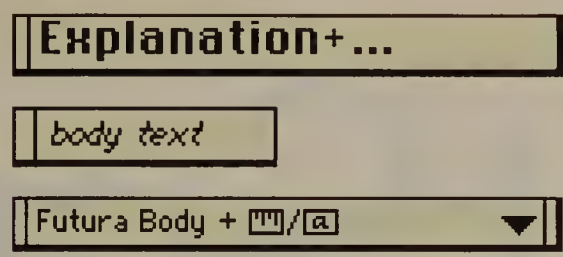
Basing One Style on Another

A WELL-DESIGNED DOCUMENT MAY have many different elements—headings, body text, sidebars, tables—but most elements share some common formatting. You might, for example, use Palatino Bold for headings and plain Palatino for body text, headers, and footers. When defining styles, you can base numerous styles on one *base style* that reflects the bulk of the formatting information. If you need to do a major redesign—say, switching from the Palatino font family to Futura—you can simply change the base style.

All three programs provide a base style that they apply to text unless you specify a different style. In Word and WordPerfect, this base style is called *Normal.* In WriteNow, it's called *Body Style.* All three programs also provide predefined styles for headers, footers, footnotes, and other parts of a document. In Word and WriteNow, these predefined styles are based on the Normal or Body Text styles, respectively. By modifying those base styles, you can change the appearance of headers, footers, and other elements, too.

How to: Word To redefine the Normal style, choose Style from the Format menu, and then select the Normal style. Use the ruler or the commands in the Font and Format menus to change the formatting as desired. Click on Define, then on Close.

To change a style's base style, choose Style and then select the style for which you want to define a new base. Choose the



Overriding Styles Each program tells you when you've overridden a style with some manual formatting. Top: Word's plus sign and ellipsis. Middle: WordPerfect's italicized style name. Bottom: WriteNow's plus sign plus ruler- and character-formatting icons.

desired base style from the Based On pop-up menu, then click on Define. For example, say you have a style named Subhead that's based on a style named Head. If you want to base Subhead on Normal instead, choose the Style command, select Subhead, and then select Normal from the Based On pop-up menu. (Whew—now you know why many people don't use style sheets.)

How to: WordPerfect Choose Edit from the Styles submenu (Layout menu), then double-click on the Normal style. Specify the desired formatting, and then close the Normal style window. If you want to base the header, footer, footnote, or any other element styles on the Normal style, edit each style and choose Normal from the Based On pop-up menu.

How to: WriteNow Choose Edit/Delete Style from the Custom menu, then double-click on the style named Body Style. Use the ruler or the Font, Size, and Style menus to change formatting, then click on OK. To base a new style on the Body Text style, choose Body Style from the Base This Style On pop-up menu when creating the new style.

You don't have to base a style on Normal or Body Style—you can make the base a custom style that you create. You might create a base style named Newsletter and then create your own header, footer, and caption styles that are based on the Newsletter style.

Redefining a Style

STYLES LET YOU REDESIGN A DOCUMENT in one swoop. The instructions in the previous section showed how to redefine the Normal or Body Text styles. You can use these same steps to redefine a style that you've created.

You can also use these steps to redefine a program's built-in styles, such as its header, footer, and footnote styles. In WriteNow and WordPerfect, these styles automatically appear in the style-editing dialog box. In Word, however, they don't automatically appear. To display Word's *standard styles*, as they're called, click on the All Styles button in the Styles dialog

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box. When you do, you see a list of nearly 30 predefined styles. Some control the appearance of headings created in Word's outline view; others govern the formatting of index and table of contents entries. All of these standard styles are based on the Normal style.

Making a Style Available in All Documents

WHEN YOU DEFINE A NEW STYLE, IT'S available only in the document that was active when you created the style. But it's easy to change that and make one or more of your custom styles available in all new, untitled documents you create. Before performing the following steps, be sure the document in which you created the styles is the active document.

How to: Word Choose Style from the Format menu and select the style you want to be available in all documents. Click on the Use As Default button, and then on Yes.

How to: WordPerfect To make a style available to all documents, copy it to WordPerfect's *private library*. Choose Librarian from the File menu, then choose Styles from the Resource pop-up menu. Select the style you want to copy, then click on Copy.

How to: WriteNow To make custom styles available in all new documents, you need to save the active document as the WriteNow default document. First, save the document normally, to make sure your latest changes are committed to disk. Next, delete all of the text in the document, including that of headers and footers (unless you want that text to appear in all new, untitled documents). Now choose Save As Default Document from the File menu and click on Replace. Finally, if you want to restore the document's text to continue working on it, choose Revert to Saved from the File menu. Otherwise, close the document and click on Don't Save.

Word and WriteNow provide other ways to move styles from one document to another. In Word, you can access the styles in a different document by choosing Open while the Style dialog box is open. You can also copy a style by simply copying a paragraph formatted with that style, and then pasting it into another document. You can also do it by copying the last paragraph mark (the ¶ symbol visible when you choose Show ¶) in a document and pasting that into the new document. In WriteNow, you can use the Custom menu's Import Styles command to access another document's styles. All three programs also let you create stationery documents, which store styles and other often-used elements.

Overriding a Style

YOU CAN OVERRIDE A STYLE YOU'VE applied by using your program's formatting features as you normally would. Each program has its own way of indicating that you've overridden a style with manual formatting (see "Overriding Styles").

Why would you override a style? Often, to apply additional character formatting—to italicize a word in a sentence. Another reason might be to change paragraph formatting—to center a paragraph instead of justifying it. But extensive overriding defeats the purpose of styles. If you frequently override a style in the same way, consider creating another style based on the style you've been overriding.

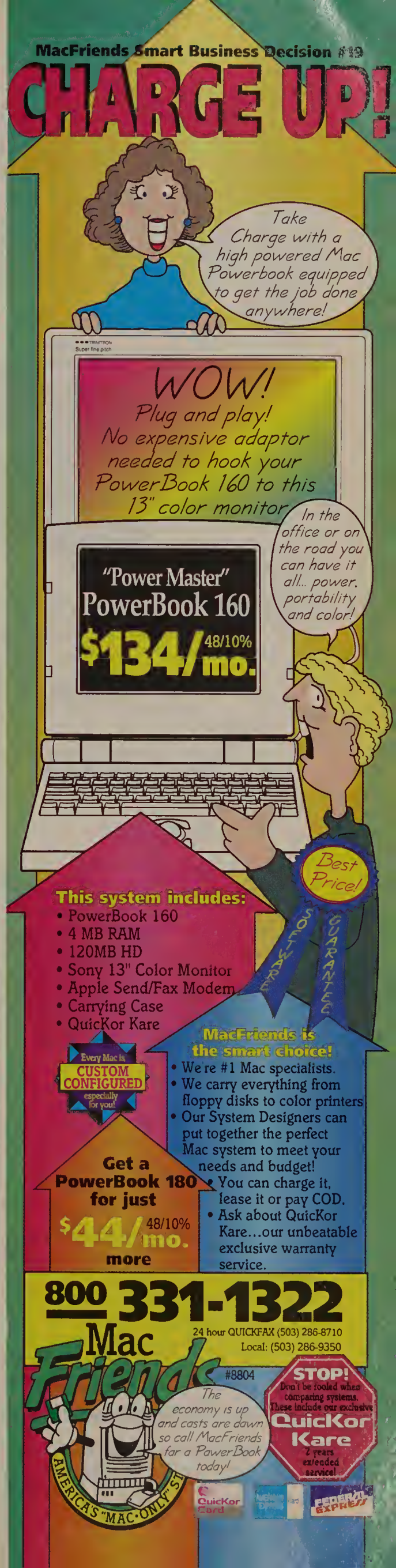
The character-level styles that WriteNow provides can also eliminate the need to override a style in order to apply additional character formatting. For instance, if you always italicize the first occurrence of a technical term, you might create a character style that reflects this formatting. Another word processor, Nisus Software's Nisus, also provides character-level styles, as will Claris's long-awaited MacWrite Pro, now scheduled to ship early this year.

Become Style Conscious

IF YOU USE A PROGRAM THAT DOESN'T provide style-sheet features—Microsoft Works, ClarisWorks, MacWrite II—you can simulate styles by using a keyboard-customizing program such as CE Software's QuicKeys. With Microsoft Works, you can create macros to automate formatting. The Microsoft Excel spreadsheet program has some slick style features of its own that let you automate the formatting and alignment of cells.

OK, styles *can* seem complicated, especially when you start wading through next-style and based-on options. But you don't have to start out in these backwaters. Start by creating some simple styles for the types of documents you create. For your correspondence, define a return-address style that automatically indents your address and closing. For a newsletter or manual, define styles that format your headings and body text. Redefine Normal or Body Text style so you don't have to change fonts, tabs, or margins every time you create a new document. Become style conscious. You'll cut down on repetitive formatting and have more time to refine your writing. Isn't that why you use a word processor to begin with? ■

Contributing editor JIM HEID looks at a different aspect of Mac fundamentals each month. He covers System 7 and 7.1 in his latest book, the second edition of *Inside the Apple Macintosh* (Brady, 1992), which he coauthored with Peter Norton.



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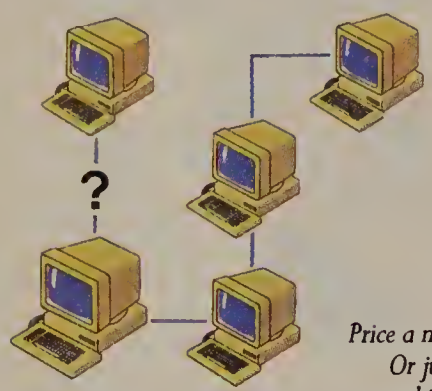

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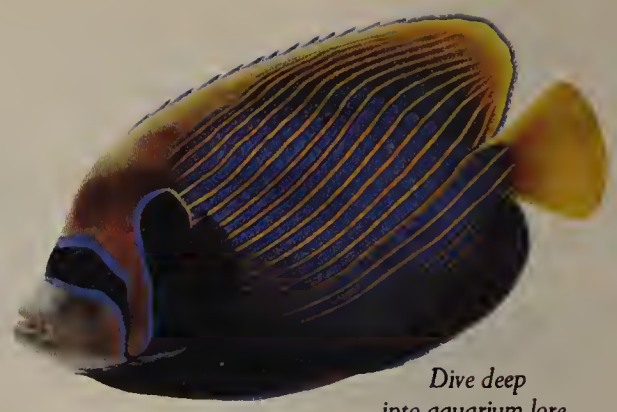

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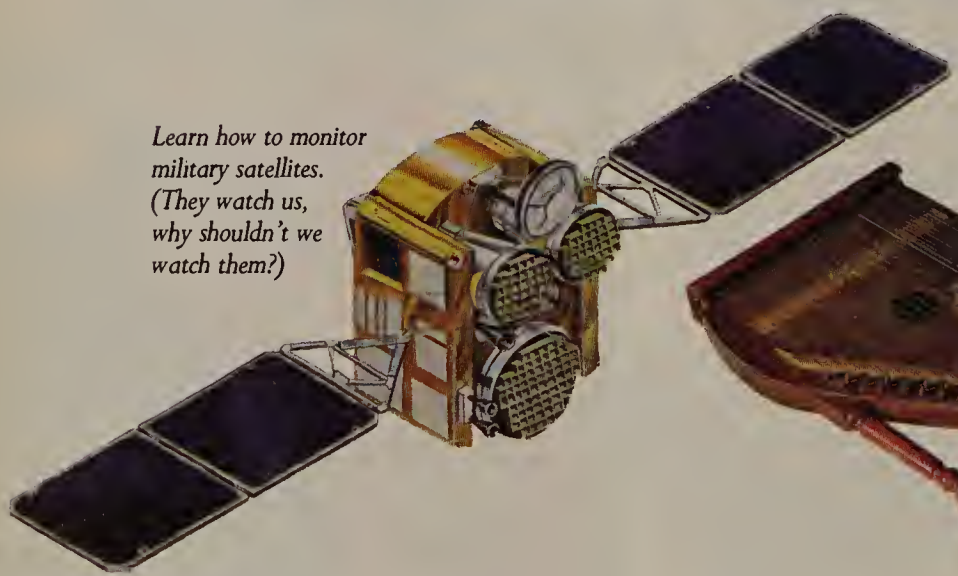

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BY CARY LU

PowerBook Notes

The Care and Feeding of Batteries

THE BEST THING ABOUT A POWERBOOK is its ability to run on batteries, so you can compute anywhere. The worst thing is the care and maintenance of its batteries. Alone among computer components, batteries can and will fail—permanently—through simple inattention. And even if you take care of batteries carefully, Apple warns that they may fail in a year or two anyway. Still, with reasonable care, most batteries should last longer than that; some nickel-cadmium batteries have been in regular use for more than a decade.

A PowerBook user has only one real choice—to learn to use and maintain batteries properly. First you should read and memorize Apple's recommendations on battery care for your specific type of battery. Apple has produced four batteries in three classes so far. The comments here apply to the batteries sold by Apple; batteries for other types of computers may vary in their performance and life span.

PAUL FRANZ-MOORE

Nickel Cadmium

NICKEL-CADMIUM (ALSO CALLED NICAD) batteries run the PowerBooks 140 through 180. The original version (M5545/A) had 2.5 ampere hours; Apple later introduced a 2.8-ampere-hour version (M5545/B) and then a 2.9-ampere-hour version (M5545/C). The three versions are the same size and are interchangeable. Apple's original 15-watt AC power adapter (model M1058) for the early PowerBooks (100, 140, 145, 170) has been replaced by a 17w AC adapter (M4660). Both adapters work in PowerBooks 100 through 180; the newer adapter recharges batteries faster than the original model.

Nickel-cadmium battery technology is well established. With reasonable care, a NiCad battery should last for up to 800 recharge cycles. Its best-known problem, called the memory effect, is actually quite rare. If you repeatedly subject a NiCad battery to identical partial discharges—such as computing for an hour a day—and then recharge, the battery "remembers" the partial discharge level and will not fully recharge. If the depth of the partial discharges varies, you won't get a memory effect. In one study, Apple examined 30 NiCad batteries that had been returned to dealers as defective. Only one displayed a memory effect; the other 29 worked correctly.

To recover from and ensure against a memory problem, Apple recommends that you run down a NiCad battery once every three months by running a PowerBook on the battery through all the power warning messages until the computer goes to sleep by itself. Then recharge the battery fully. If you really have a memory problem, leave the battery in a PowerBook overnight before recharging. This discharge process does not run the battery voltage down to zero; such a complete discharge runs a serious risk of irreparable damage. Instead, this "full" discharge cycle drops the voltage to about 5.5 volts. A battery conditioner exercises a battery through discharge down to 5.0v, followed by a full charge. Lind Electronic Design (612/927-6303, 800/659-5956) sells a $189.95 battery conditioner; Applied Engineering (214/241-0055, 800/554-6227) has one for $146. Conditioners are especially useful for corporate computing facilities that may need to deal with many batteries.

Lead Acid

LEAD-ACID BATTERIES ARE USED ONLY IN the PowerBook 100. Lead-acid batteries are the easiest to take care of; all you have to do is charge them regularly—at least every few months even if not in use. *Never purposely discharge one as you would a NiCad battery—and leaving a lead-acid battery on the shelf until it self-discharges will kill it.* Lead-acid batteries do not have a memory problem, but they do suffer from relatively low power density—the energy stored per pound. Their density is about a third less than NiCad's, and lead-acid batteries typically last for only about 300 recharge cycles. In a pinch, all the PowerBook 100 to 180 AC adapters will work with lead-acid batteries.

The long-discontinued Macintosh Portable also used lead-acid batteries, which are no longer available from Apple. Shadow Technologies (510/548-0130) supplies lead-acid batteries (as well as a backlight upgrade) for the Portable.

Nickel–Metal-Hydride

NICKEL–METAL-HYDRIDE (ALSO CALLED NiHy) batteries are used in the Power-

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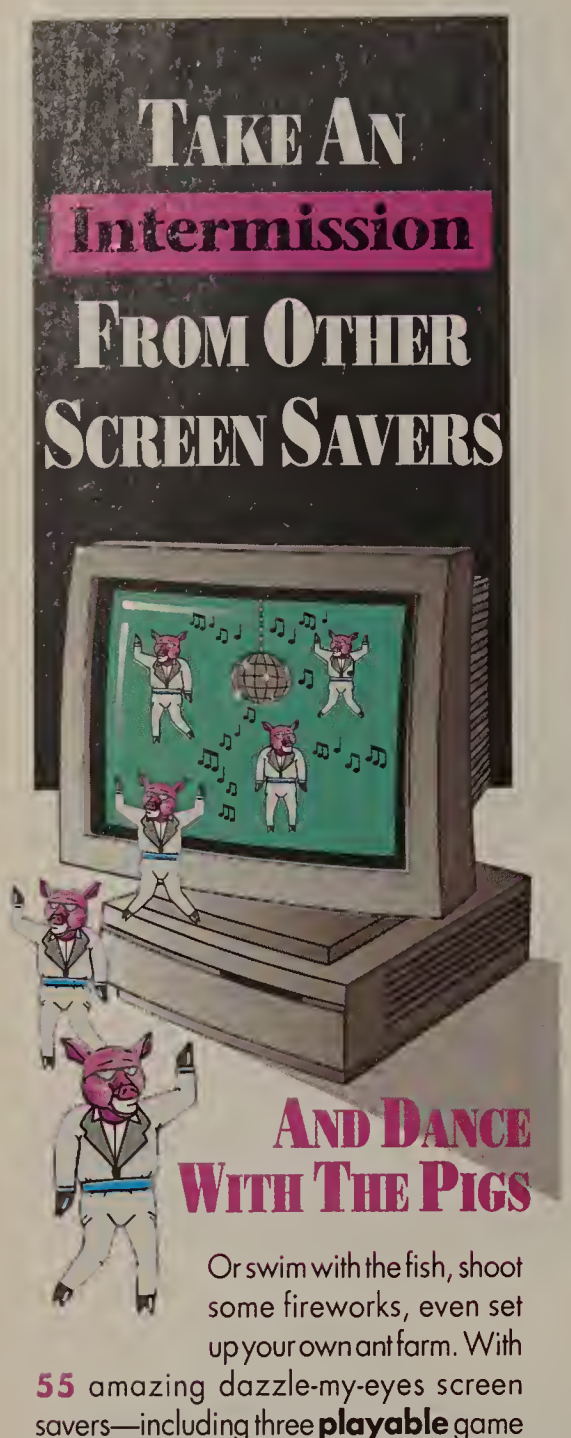

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How to Save Power

The best way to conserve battery power is to set system and hard drive sleep times to minimize energy use. The PowerBook control panel in System 7.1 gives you a slider control to adjust power consumption for maximum performance or maximum power conservation. Unfortunately, the slider's four settings are not documented in the System 7.1 manual sent out with upgrades, although new PowerBook purchasers can find the information in their manuals. Here's the scoop. Each setting corresponds to how long the PowerBook waits before it goes off to slumberland. If you choose Maximum Performance, for example, the system nods off only after 15 minutes without keyboard or trackball action; the hard drive goes to sleep after 15 minutes as well. The numbers for all settings are listed in "Sleepy Time" and are the same for all PowerBook models.

After setting system and hard drive sleep times, the best way to save battery power is to turn off the backlighting. Here are some other steps that will help you minimize battery usage.

- Use the Chooser to turn off AppleTalk if you aren't using it.
- Quit any communications programs whenever you are not using a modem; don't leave the program running in the background.
- Turn off the sound with the Sound control panel (this will not turn off the start-up sound).
- Don't wait for automatic sleep; invoke sleep whenever possible, even if only for ten seconds.
- Use the hard drive as infrequently as possible, and set the hard drive to sleep as quickly as you can tolerate, but not so quickly that you have to start it up again frequently.
- Use a RAM disk (see last month's column), preferably a start-up RAM disk with a complete System Folder, application, and documents. The hard drive may still turn on during file operations, so you should throw its icon in the Trash to prevent it from starting up again until you restart.

Book Duo models. NiHy batteries boast about 25 percent higher energy density than NiCad ones, a significant advantage. Although nickel–metal-hydride is theoretically susceptible to a memory problem, Jeff Phillips, Apple's battery guru, says he has never encountered the problem with NiHy. All batteries suffer at high and low temperatures; compared with nickel-cadmium batteries, NiHy batteries suffer more. They can be damaged at high temperatures, such as in a closed car in the summer, and they do not charge well at below-freezing temperatures. Phillips says that the NiHy batteries sold by Apple should be good for up to 1000 recharge cycles.

NiHy batteries have gotten a reputation as more environmentally benign than NiCad or lead-acid, since they are subject to fewer real or proposed environmental regulations. But that is just wishful thinking; regulations take time to develop and simply have not caught up with NiHy batteries yet. All Apple batteries should be returned to an authorized service provider for disposal or recycling. Indeed, no battery of any kind should be thrown away in household trash.

Storage

HOW LONG CAN YOU STORE A POWERBook battery? Apple suggests the following guidelines (which apply if the batteries are stored under cool conditions). After one month, nickel–metal-hydride batteries (Duos) should still have the minimal charge needed to operate a PowerBook. NiCad batteries should maintain that charge for one to two months. After a time, either kind of battery will lose the charge needed to operate the machine, but are still capable of being recharged. That time period covers 6 to 12 months if a NiHy or NiCad battery is sitting inside an unused PowerBook; it's one to two years if the battery is being stored outside a PowerBook, in a cool place. After two years, the viability of the battery is uncertain.

Sealed lead-acid batteries hold their charges longer; one that's been fully charged but unused for two to three months should have enough juice to operate a PowerBook. And these batteries should still accept recharging after 12 to 18 months. Again, it's anybody's guess after two years.

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Batteries may be damaged if stored for prolonged periods in a circuit that draws power without recharging. Except for the 100, PowerBooks contain a small, rechargeable backup battery, for the parameter RAM, that draws some power. That's why batteries will last longer if stored outside a PowerBook.

If you have several batteries, label them so you can tell them apart; be sure to use all of them regularly. If you travel frequently with two or more batteries, consider getting an optional battery charger that charges two batteries at a time. Unless you have a Duo, this battery charger requires an AC power adapter of its own—if you want to use the charger and your PowerBook on AC power at the same time, you need a second AC power adapter.

AC Adapters

IF YOU WANT A SECOND AC POWER adapter, you might look at an alternative to Apple's models. Empire Engineering (805/543-2816) has developed a much-smaller adapter, which will be distributed later this year by another company. It does have the minor disadvantage of running on 120-volt AC only, unlike Apple's universal adapters, which run on anything between 80v and 270v. Empire sells a separate adapter for 240-volt countries.

Most AC adapters are a little awkward because of their fixed AC plug prongs, which can mar the inside of a carrying case. There are two easy ways to overcome this small problem. One is to make a prong cover out of high-density rubber foam, for example, or from a 3-to-2-prong grounded outlet adapter with its prongs cut off and filed smooth. The second is to plug the AC power adapter into an extension cord. An extension cord also solves another problem: Apple's AC adapter is too big to plug into a wall (or into a power strip) adjacent to another plug. Apple slimline AC adapters for the PowerBook Duos are easier to pack; they use a detachable AC cord, especially handy for foreign travel.

And you should carry an extension cord anyway; despite the freedom of a PowerBook's batteries, you should use AC power whenever possible to conserve batteries for those times when you really need them. AC power is widely available, even in hotel ballrooms and airport waiting rooms; a 12-foot extension cord can help out greatly, especially if you want to avoid sitting on the floor. (Wide masking tape can keep the cord from tripping an occasional passerby; avoid running the cord across a high-traffic area.) You can even find AC power on most airliners—next to the toilet. That plug (usually 120v AC) is intended for electric shavers. While other passengers may become more than impatient if you sit in there for a full recharge cycle, the outlet comes in handy if your battery is nearly dead and you must save the file on a disk. It would be nice if airlines installed power connectors for portable electronic devices (and someday they may in first- and business-class seats), although 120v or 220v connectors might raise some serious safety questions and there is no standard DC voltage except for car batteries.

Car Batteries

IN CARS AND BOATS, YOU HAVE TWO ways to use the standard 12v power supply. A DC-to-DC adapter lets you plug a PowerBook directly into a cigarette lighter. Or you can convert the 12v power to 120v AC first through an inverter, which plugs into the cigarette lighter; you then plug a PowerBook AC adapter into the inverter. The smallest, most flexible DC-to-DC converter I've found is the $99 Universal DC Pocket Adapter sold by Empire Engineering. It works on any 10v-to-30v DC supply, so it runs not only

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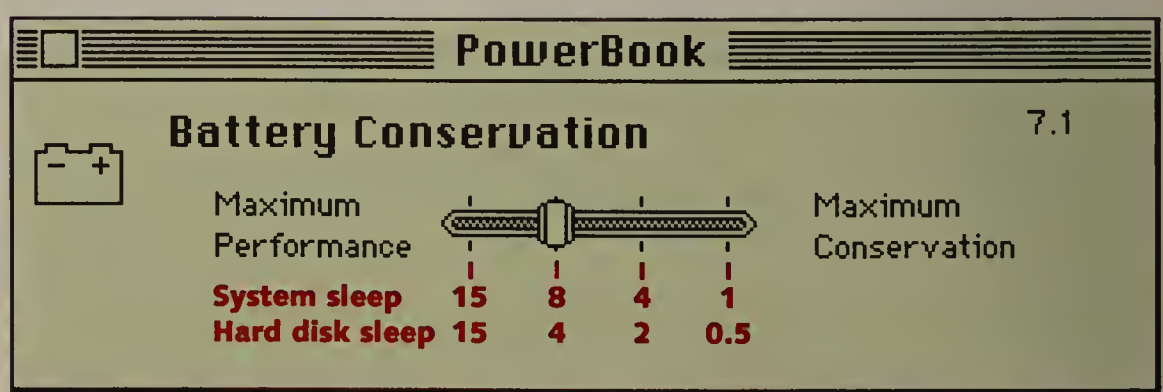

Sleepy Time The PowerBook control panel in System 7.1 allows users some control over power consumption, but doesn't show the number of minutes the PowerBook is inactive before system sleep and hard drive sleep kick in automatically; we've added those numbers above. If the slider is set on Maximum Conservation, for example, the PowerBook puts the System to sleep after 1 minute of inactivity; it sends the hard drive to sleep after 30 seconds of inactivity.

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in cars but also on the 24v-to-28v DC in aircraft, medical, and military vehicles. Most other car adapters are limited to 11v-to-14v DC. The 120v AC inverters are much bulkier than DC-to-DC converters but can power any product that you might otherwise plug into a standard AC socket, up to the power limit of the inverter; a 140w (continuous) inverter sells for $70 to $100 from many electronics stores. Inverters are less efficient than DC-to-DC converters, but the difference isn't significant for a car battery in decent condition.

If you charge a PowerBook in a moving vehicle, look for a way to secure the power plug, which slips out easily. A rubber band looped around the power cord and the nearby right rear foot of the PowerBook can help. Perhaps Apple will consider a locking plug in future models.

Larger Batteries

INEVITABLY, YOU WILL NEED TO RELY ON batteries part of the time, and chances are you won't get more than an hour or two of steady use from any built-in battery.

To get longer operating time, you can carry extra batteries or use a larger battery. But you can't simply make a battery pack with ordinary batteries and plug it into a PowerBook, because the power supply must limit and control the current in accordance with the charging circuit built into every PowerBook. So it's not simple, but it is possible, as several companies show with products that work in all PowerBooks except the Duos. The $189.95 Auxiliary Power Pack from Lind Electronic Design, mentioned earlier, has a 5-pound $189.95 lead-acid-gel cell able to run a PowerBook for about 8 hours. Interex Computer Products (316/524-4747) sells Power-to-Go, an $89.95 battery pack that accepts eight standard alkaline D cells and runs PowerBooks for 9 hours. A full battery pack weighs 3.2 pounds; it uses disposable alkaline cells only and does not accept rechargeable D cells. AER Energy Resources (404/433-2127, 800/769-3720) offers a $649 Zinc Air external battery that runs for 20 hours; it weights 6 pounds, and although it comes with its own 1-pound AC charger, it requires a $99 PowerBook cable adapter. The Zinc Air Power 20 has a lifetime total of 400 hours of operation; after this time, you need to replace the battery pack ($399). All battery-life estimates given here come from the manufacturers. And you should always confirm that any third-party power supply is suitable for your specific PowerBook model before you buy it.

Changing Batteries

POWERBOOK MODELS 140 THROUGH 180 have a special problem when you change batteries—you must shut down the computer, erasing the RAM disk if you have one and interrupting your work. Utilitron (214/727-2329, 800/428-8766) has a tiny $40 PowerSwap that solves this problem by adapting a standard alkaline 9v battery to supply short-term power so you can put the computer to sleep instead of shutting it down during the battery change. The PowerBook 100 and Duos have backup batteries that keep the RAM alive during sleep, so you can change the main battery easily.

All PowerBook batteries should keep RAM alive for about a week in sleep mode, even if the battery level has fallen to the point of shutting down the computer. But since battery performance varies considerably, for peace of mind you should save any important files on disk before you run out of power.

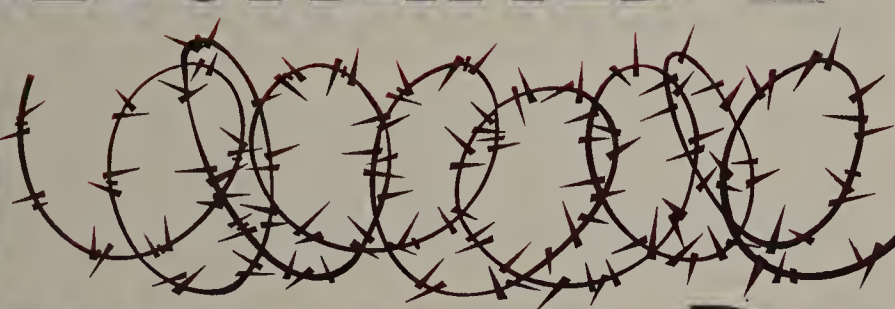
Power Strategies

IN SYSTEM 7.1, THE POWERBOOK CONtrol panel controls CPU speed and cycling when you click on the Options button. The main control lets you choose from four levels of power conservation. The choices set the time delay before putting the hard drive to sleep and invoking system sleep. In System 7, you set the two kinds of sleep independently in the Portables control panel; for the PowerBooks 145, 160, 170, 180, 210, and 230, you can reduce the CPU speed and save power by turning Power-Saver on in the Battery DA (System 7) or selecting Processor Cycling and Processor Speed from Options in the PowerBook control panel (System 7.1).

The Norton Essentials for PowerBook from Symantec (408/253-4092) takes power conservation one step further by letting you set the conservation strategy according to the application. You could, for example, set a longer hard drive sleep time when you use a disk-intensive database program. CPU Utilities ($99) from Connectix (415/571-5100, 800/950-5880) also offers custom power conservation, organized not by specific application but by five sets of applications, grouped according to home, office, travel, and so forth.

After setting system and hard drive sleep times, the best way to save battery power is to turn off the backlighting with the brightness control just below the screen. If you are computing outdoors in

continues

To Viruses It's Like A In Front Of An Electrified , And  , Totally Surrounded By A Moat Full Of .

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the daytime, backlighting doesn't help anyway. Daylight through a window may suffice when indoors. With good lighting you can use grays; in weaker light, you should turn off grays by selecting Black & White in the Monitors control panel. On an airplane, sit next to the window on the sunny side if the sun will be behind you; you probably won't need backlighting. If you wear sunglasses, try the simple kinds without polarization and with lighter rather than darker filtration. Polarized sunglasses are a problem because LCD panels use polarization to create the image, and tilting your head darkens or lightens the LCD image in a disconcerting way. Special polarizing glasses could improve the contrast of the screen, but there are some practical problems: the polarization would have to be set at either plus 45 degrees or minus 45 degrees—the angle that works for one screen can produce a black image on a second, since LCD panels come either way. Such glass would not replace conventional polarizing sunglasses, which are set at 0 degrees to control glare from horizontal surfaces. And you would still have a problem if you tilted your head.

In some brightly lit indoor situations, you can turn off the backlighting (although if there is sufficient artificial light, you have a good chance of finding an AC outlet to plug into). A large font—18- or 24-point—helps greatly. Finding the cursor can be a problem, however. A software fix such as CPU Utilities enlarges the cursor and highlights it with a large black circle on command. BullsEye, one of ten utilities in The Deal ($30) from Paper-Clip Products (918/749-7417, 800/497-5508), briefly highlights the cursor position with a large circle. Norton Essentials also includes a cursor finder. Both CPU Utilities and Norton Essentials let you set a time to put the backlighting to sleep before the system goes to sleep. When you resume work, the backlighting comes back on more quickly than it does when the system comes out of sleep.

Occasionally you may find that an inverted screen works better. An inverted screen has white characters on a black background rather than the usual black on white. For example, if you work in the passenger seat of a car at night, a normal screen with backlighting is bright enough to distract the driver; inverting the screen minimizes this problem—provided that you can touch-type, since you can't see the keyboard. The utility inLarge from Berkeley Systems (510/540-5535) can do many things, including invert the screen. Although $195 is a lot to pay to get screen inversion (a minor part of inLarge's overall function), the freeware and shareware inverting utilities that I have found so far aren't System 7 compatible.

To maximize battery life, you should take additional steps to conserve power. See "How to Save Power" for more tips.

Looking Ahead

THE BATTERY DA AND SIMILAR UTILITIES use battery voltage to estimate the charge remaining and, sometimes, the operational time remaining. The indicators are not particularly reliable, however, since both NiCad and NiHy batteries put out fairly constant voltage over time—until the end, when the voltage drops quickly. Thus the power-warning messages really do mean the battery will die soon. For PowerBooks that use NiCads, the first warning is at 5.9v, the second at 5.75v, the third and last at 5.5v; the computer shuts down at 5.4v, according to Apple's Phillips. A sophisticated energy-management system could track prior battery performance and actual usage against the charging time for more accurate estimates of time remaining on a charge. This strategy could add cost, however, since it must sense specific batteries.

The most straightforward way for Apple to achieve higher battery capacity would be to redesign the battery pack. Like most companies, Apple uses cylindrical NiCad and NiHy cells even though the battery case is rectangular. Rectangular cells offer about 25 percent more capacity simply because they have greater volume. Rectangular cells are much more than 25 percent more expensive, however, and are heavier as well. Developing rectangular cells probably won't be a priority for Apple, but a third-party company might introduce such a premium battery pack.

Lithium-ion batteries have 30 percent better energy density than NiHy and may reach the market in a year or two. Meanwhile, battery manufacturers such as Duracell are promoting standardized NiCad and NiHy battery packs, which would allow users to interchange the same battery across many products. And slow, steady improvements in NiCad, NiHy, and even lead-acid batteries should also help out present owners of PowerBooks.

Regardless of where technology takes us, one thing is certain: your battery will still quit at the most inconvenient time possible. **m**

CARY LU got his first Mac in the summer of 1983. He is the author of *The Apple Macintosh Book* (1992, Microsoft Press).

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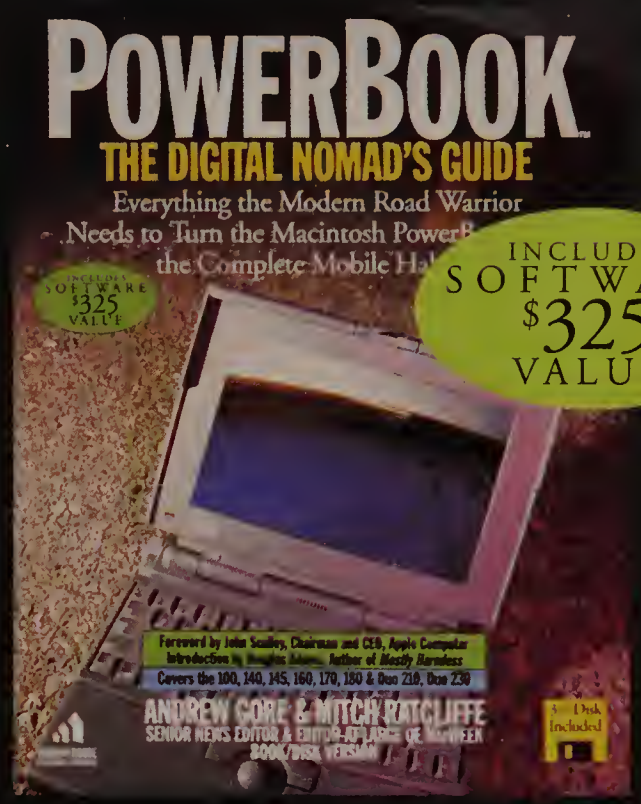

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ACCOUNTING/FINANCE

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★★★★ **Components 1.0, Satori Software, 206/443-0765, $795 per module.** Simple, flexible architecture sets a new design standard for Macintosh accounting software, but is not without its bugs and flaws. Sep 92

◪ **Great Plains Accounting 6.0 (6.1), Great Plains Software, 701/281-0550, $795.** High-end bookkeeping software offers a first-rate lineup of dedicated modules. Different individuals or groups can easily use the various accounting functions.

★★ **HyperTax Tutor 1991, SoftStream International, 508/991-4011, $99.** If you're willing to put up with a design that's neither intuitive nor easy to use, this cross-referenced book contains extensive explanations, strategies, and examples of complex IRS tax laws. Apr 92

★★★ **Job Cost/Time Billing 1.05, Satori Software, 206/443-0765, $1495.** Professional billing software incorporates high-end job-cost and accounts-receivable features in one module, plus an excellent report function; but confusing elements, minor bugs, and inaccuracies in the documentation are weaknesses. Aug 92

★★★★ **MacInTax 1991, ChipSoft, 619/453-8722, $79.95.** On-screen replicas of IRS forms ease the preparation of tax returns in this personal income tax software, but the help text (lifted straight out of IRS documents) is unclear. Apr 92

★★★★ **Managing Your Money 5.0, MECA Software, 203/256-5000, $79.95.** An already strong financial-management program becomes easier to use and slightly more powerful with this upgrade. Jan 93

◪ **MYOB 3.0, Teleware, 201/586-2200, $249.** A file-cabinet metaphor makes the interface of this accounting package easy to use and understand. For an accounting system with one user who has no need for payroll capabilities, it's the best choice.

◪ **Quicken 3.0, Intuit, 415/852-9696, $69.95.** Track assets, liabilities, income, and expenses with this personal-finance package. It has a good Mac interface and is easy to learn and use.

★★★★ **Timeslips III 2.1, Timeslips Corp., 508/768-6100, $299.95.** Complexity is the price you pay for this time-billing utility's impressive flexibility. Fortunately, thorough documentation, excellent tech support, and default settings help any user get started. Sep 92

BUSINESS TOOLS

◪ **4th Dimension 2.0.10 (2.2.3), ACIUS, 408/252-4444, $795.** The truly high-level computer language of this database still allows control of small details in data representation and display, but to exploit all of its features, you need a programming background.

★★★ **Aspects 1.01 (1.03), Group Technologies, 703/528-1555, $285 to $1295.** Collaborative software allows up to 16 people to edit a project. Controlled access as well as individual and linked views are good features, but the lack of outlining and spreadsheet modules limits its usefulness. Jun 92

★★★★ **Atlas Pro 1.0.6 (1.5), Strategic Mapping, 408/985-7400, $795.** Although this mapping software is not a complete geographic-information system, it boasts a rich feature set and a competitive price. Nov 92

★★★ **Bar Code Pro 1.0, Synex, 718/499-6293, $450.** Easy-to-use desk accessory creates bar codes in EPS or PICT for use in desktop publishing or labeling programs. It does well what it sets out to do, but lacks automatic sequential coding and fails to catch invalid characters. Sep 92

◪ **Claris Resolve, Claris Corp., 408/727-8227, $249.** Advanced features come within easy reach of spreadsheet pedestrians with this program. Anyone can learn how to use it in 10 minutes and how to customize it in 20.

★★★★ **DataPivot 1.02 (1.1), Brio Technology, 415/961-4110, $299.** Convenient and flexible report-generator includes fast formatting, automatic import, and almost every other item on the wish list of users who need report tables that emphasize cross-tabulation. May 92

★★★★ **DeltaGraph Professional 2.01 (2.02), DeltaPoint, 408/648-4000, $295.** A smooth interface and outstanding technical support are only two of the stellar features in this graphing and charting program. This upgrade adds 13 new chart types and a number of presentation capabilities. May 92

★★★★ **Fair Witness 1.1 (1.2), Chena Software, 215/770-1210, $295.** A valuable tool for planning any project, this software coherently integrates outlining, information charts, scheduling, and time charts. Oct 92

★★★★ **FileMaker Pro, Claris Corp., 408/727-8227, $399.** Easier scripting, improved mailing labels and text-handling, and support for QuickTime and Apple events are the major new features of this upgraded, multiuser, flat-file database. Although it has some minor bugs, this is a strong upgrade to an excellent program. Jan 93

★★★ **FlowChart Express 1.0, Kaetron Software Corp., 713/890-3434, $149.** Inexpensive, easy-to-use flowchart software readily meets the needs of most flowchart creators, although those with extensive requirements will still need a larger, more powerful feature set. Jan 93

★★★★ **GeoQuery 3.02, GeoQuery Corp., 708/357-0535, $395.** Gain geographic perspective with this custom-map generator and data-analysis software that uses zip codes to create "pushpin" maps of files from your spreadsheet or database. Nov 92

★★★★ **GraphMaster 1.31a (1.33), Visual Business Systems, 404/956-0325, $295.** Excellent general-purpose charting and graphing program offers a number of unusual features, including pictographs and 360-degree free rotation. A frequent inability to undo actions is the only serious irritation. May 92

◪ **GreatWorks 2.0, Symantec, 408/253-9600, $299.** High marks to this integrated program for including an outlining module and a color paint module. While the integration may not be ideal, it's a solid program, worth a close look.

★★★★ **Lotus 1-2-3 for Macintosh 1.0 (1.1), Lotus Development Corp., 800/343-5414, $495.** Spreadsheet program from the other side holds its own against Mac competitors. Its many strengths include graphing, well-implemented linking, compatibility with the DOS version, and an outstanding Help system. Apr 92

◪ **MacProject II, Claris Corp., 408/727-8227, $599.** Draw task boxes and connect them with lines that define project logic using this project-management software. It links with Resolve to produce seven types of graphs and tables, but other programs offer more elaborate reporting and scheduling options.

★★★★ **Microsoft Excel 4.0, Microsoft Corp., 206/882-8080, $495.** Create impressive spreadsheets with this upgrade that includes all the features you wished

continues

Star Ratings

for and more. It's slower, and now needs 2MB of RAM for practical use, but almost all users will want to upgrade. Oct 92

★★★★ **Microsoft Project 3.0, Microsoft, 206/882-8080, $695.** An amazing range of functions, including new scheduling and formatting, are packed into this upgraded project-management software. The improved tool bar helps novices schedule tasks with push-button ease. Jan 93

★★★ **Microsoft Works 3.0, Microsoft, 206/882-8088, $295.** Capable but unspectacular upgrade delivers marginally improved functionality and a welcome face-lift to this integrated program, but there are a number of incompatibilities, odd design choices, and performance flaws. Feb 93

★★★★ **Muse 1.0 (1.01), Occam Research Corp., 617/923-3545, $695.** Innovative data-analysis software is based on a large, ambitious vision of how to organize and use data, and is an excellent environment for some data handling. Free-form query language is powerful, but easy to misread. Jun 92

★★★★ **nuBase Pro 1.5 (1.54), Tactic Software Corp., 407/832-6691, $395.** Although still slower than FoxBase and without the rich feature-set of 4th Dimension, this is the only relational database that makes it possible for users with no programming experience to design a useful database. Sep 92

★★★ **Office Manager 2.1 (2.2), White Crow Software, 802/658-1270, $99.** Simple contact- and project-management software is powerful for small databases, but reliance on HyperCard limits its usefulness for low-end Macs. Dec 92

★★ **Office Wiz 1.1 (1.1.2), Oryx Associates, 415/563-9971, $695.** 4D-based program attempts to integrate calendar, project, and contact management, as well as simple accounting for a multiuser environment, but the complexity of the interface requires a substantial investment in start-up time. Nov 92

★★★ **Omnis 7 1.1, Blyth Software, 415/312-7100, $1250.** The plain, businesslike functionality of this database-development system produces solid applications without much fuss. Dec 92

★★★★ **Panorama 2.0 (2.06), ProVue Development Corp., 714/892-8199, $395.** Disarmingly easy-to-learn flat-file database is full of labor-saving data-entry features, plus it boasts a remarkable macro function that lets you record and play back almost any series of database routines. May 92

★★ **PEMD Discovery 1.3.1, PEMD Education Group, 707/894-3668, $189.** Unsophisticated data-search and -retrieval routines, limited displays, and a weak manual restrict this graphical data-analysis software's usefulness. Apr 92

★★★ **Perspective 1.5, U.S. Data on Demand, 800/352-7352, $129.95.** The level of detail and comprehensive information in this collection of U.S. demographic and economic data is impressive, and the reasonable price puts it within reach of even the smallest business. Sep 92

★★ **PowerPlay 1.0 (1.1), Cognos, 617/229-6600, $695.** A good program for a very limited range of business-analysis tasks. The views of data and graphs are small and manageable, and the program tabulates them in several colorful ways. Aug 92

★★ **PowerTrax 1.1 (1.2), Soft Solutions, 404/457-9400, $495.** Convoluted and repetitive data-entry processes slow you down when they should speed you up in this 4D-based information-management system. Apr 92

★★★ **RateFinder 1.5 (1.6), Elefunt Software, 510/843-7725, $99.** Numerous interface violations don't change the fact that these all-inclusive shipping-rate tables make the old-fashioned chore of checking mail rates easier and more efficient. Jun 92

★★★★ **ZP4 7 (10), Semaphore Corp., 408/688-9200, $125.** Clean up and standardize addresses with this CD ROM, thereby reducing postage costs and avoiding undeliverable mail; uses a licensed version of the U.S. Postal Service's official database of every valid postal address in America. May 92

COMMUNICATIONS/NETWORKS

★★★ **A/UX 3.0, Apple Computer, 408/996-1010, $709.** Hybrid–operating-system package implements the Stone Age, type-one-line-at-a-time text interface of Unix in a way a Macintosh user might actually like. Nov 92

★★★★ **AccessPC 2.0, Insignia Solutions, 415/694-7600, $99.95.** Slick control over formatting multiple types of DOS media is the major advantage of this file-transfer utility. Oct 92

★★★ **Carbon Copy for the Mac 2.0 (2.04), Microcom, 919/490-1277, single-user $99, multiuser $299.** Screen-sharing utility is convenient and economical for occasional use but because it competes for RAM on attended low-memory Macs, it isn't efficient enough to use as a global solution for remote-control support. Apr 92

★★★ **CompuServe Information Manager 2.0.1, CompuServe, 614/457-8600, $49.95.** The goal of this product is to give friendlier information-access to CompuServe for Macintosh users. An appealing color interface and increased speed are signs of success, but there's still room for improvement. Dec 92

★★★ **DataClub Classic, DataClub Elite 2.0, Novell, 800/638-9273, $175, $1395.** Fully distributed file servers allow users to pool the free space on their drives into one virtual server. File sharing is transparent, but when a participating Mac disconnects from the network, users lose access to files stored on its hard drive. Aug 92

★★★★ **DOS Mounter 3.0, Dayna Communications, 801/531-0600, $89.95.** If you need to use wild cards in extension mapping, this file-transfer utility is the only option, although it's slower than other file-transfer programs. Oct 92

★★★ **Macintosh PC Exchange 1.01, Apple Computer, 408/996-1010, $79.** For basic file-transfer, this control panel device allowing cross-platform file sharing is fine, but it's hardly state-of-the-art. Oct 92

★★★ **MicroPhone II 4.0 (4.0.2), Software Ventures Corp., 510/644-3232, $295.** Refinements are evident throughout this telecommunications software's upgrade, but not everyone needs $295 worth of sophistication. The impressive scripting facility is countered by poor help features. Jul 92

★★★ **NetMounter 1.00 (1.01), Dayna Communications, 801/531-0600, $99.** Reasonably priced utility provides Macs access to NetWare file servers without your having to install NetWare for the Macintosh on the server. It's not an ideal choice, but it is economical for mixed networks with only a few Macs. Sep 92

◪ **NetWare for the Macintosh 3.011, Novell, 800/638-9273, $495-1995.** NetWare 3.11, an expensive but robust network operating system, runs on a non-Mac dedicated server and is complex to manage. This set of NetWare Loadable Modules lets you add Macs to a NetWare network.

★★★ **Network SuperVisor 2.0.1 (2.1), CSG Technologies, 412/471-7170, $495.** Fast and accurate data collection is the strong point of this network-management utility, but the interface isn't that intuitive. Aug 92

★★★★★ **NetWorks 1.0.1 (2.0), Caravelle Networks Corp., 613/596-2802, $1195.** Become a network demigod with omnipresent capabilities over network devices using this network-management and paging utility. *Macworld*'s network manager loved it, calling it versatile, flexible, and worth its weight in gold. Jun 92

★★ **Notify 1.0, Ex Machina, 718/965-0309, $149.** Innovative wireless transmitter uses the Mac to send messages to pager. It's a start on a new technology, but the quirky product has a long way to go. Jun 92

★★★★ **PacerForum 1.0.1, Pacer Software, 619/454-0565, $549.** Any file server or underused networked Mac can host an online forum using this network bulletin board system. The well-designed graphical interface stands out, although the display looks better on color monitors. Jul 92

★★★★ **RouterCheck 2.0, Neon Software, 510/283-9771, $895.** Keep your finger on the pulse of router configurations and internet traffic with this network-administration utility. It's a must for midsize or larger internets, but too pricey for small networks. Oct 92

◪ **SoftPC 2.0 (2.5), Insignia Solutions, 415/694-7600, $399.** A graceful implementation of the PC architecture on a Mac, this program emulates PC AT hardware through a powerful BIOS that remaps Intel 80286 addresses to a Motorola 68000-series CPU. The main drawback is slowness.

★★★ **Status Mac 2.0.2 (3.0), On Technology, 617/876-0900, $449.** With less hassle for network managers and users, this upgrade invites customization in both the collecting and storing of information about networked Macs; users can even delay time-consuming profiling. May 92

★★★★ **TechWorks Net Utilities 1.0, Technology Works, 512/794-8533, $129.** Collection of five separate applications provides essential network-monitoring tools at a price that would please anyone. Dec 92

★★★★ **Timbuktu 5.0.1, Farallon Computing, 510/814-5000, single-user $199, multiuser $999 to $5500.** By letting one computer (Mac or Windows) control, observe, or exchange data with any other computer, this terminal-emulation product allows you to use resources almost anywhere on a company network. Despite minor blemishes, such as the inability to cut and paste between Macs and Windows PCs, Timbuktu is a clear winner. Mar 93

◪ **VersaTerm/Pro 3.1 (3.6.2), Synergy Software, 215/779-0522, $295.** It's a great tool for working with VAXs or when you want Textronix-terminal emulation, but this communications software lacks the scripting many people use for working with BBSs or commercial information services.

★★ **Vicom Terminal Emulators (4.2), Vicom Technology, 604/684-9S17, $195 to $3S00.** These bare-bones, British-designed terminal emulators lack many common U.S. modem configurations, but do support multiple simultaneous sessions. Aug 92

◪ **White Knight 11 (11.14), The FreeSoft Company, 412/846-2700, $139.** In the right hands, this product is the precision tool of communications software, but it does assume familiarity with telecommunications and with programming concepts.

DESKTOP PUBLISHING

◪ **Adobe Type Manager (ATM) 1.0 (2.03), Adobe Systems, 415/961-4400, $99.** Radically improve the quality of screen fonts and the versatility of QuickDraw printers with this font-optimizing utility that uses information from a printer font (also called an outline font) to produce accurate character representations on screen.

★★★ **Aldus PageMaker 4.2, Aldus Corp., 206/628-2320, $79S.** Interruptible screen redraw is one of the dozens of enhancements that make this upgrade well worth its price. Even so, some of the features that users need the most—opening multiple documents, for instance—are still missing. May 92

★★★★ **Fontographer 3.S, Altsys Corp., 214/680-2060, $49S.** Versatile tools that enable you to edit PostScript typefaces or create your own are the highlight of this font-design software. But beware, some processes are technical and cumbersome. Nov 92

◪ **FrameMaker 3.0 (3.0.1), Frame Technology, 408/433-3311, $79S.** Powerful and well-designed, this page-layout software is the best choice for scientific and technical publishing. It has a fine table editor and allows manual kerning, but its power demands commitment—and a Mac II–class machine.

★★★ **LetraStudio 2.0, Letraset USA, 201/84S-6100, $249.** Precise, intuitive control over character spacing and shapes, as well as a straightforward interface, make this program a great choice for manipulating type, but it lacks flashy effects, such as gradient fills. Oct 92

★★ **MacQuill 1.0, Nest Software, 408/441-1944, $99.9S.** Friendly, inexpensive page-layout program is missing basic features, such as kerning and importing, and suffers from some bugs and deficiencies, but for simple word processing and grass-roots page layout it's serviceable. Aug 92

★★ **MenuFonts 4.03 (4.04), Dubl-Click Software, 818/888-2068, $69.9S.** A control panel device that groups type styles in families and displays font names in their own typefaces sounds like a great idea, and it would be if there were fewer incompatibilities. May 92

★★★★★ **Multiple Master Myriad 1.0, Adobe Systems, 415/961-4400, $370.** Elegant execution and functional design combine in this two-axis Multiple Master typeface that exceeds all previous ideas of electronic font perfection. Jul 92

★★★ **Personal Font, Signature Software, 408/4S8-0241, $179.9S.** Turn your handwriting into a PostScript Level 3 or a TrueType font. The results are good, although not perfect—TrueType letters were not connected on screen, but this should be corrected with TrueType 2.0. Dec 92

★★★★ **QuarkXPress 3.1, Quark, 800/788-7835, $89S.** Dozens of updated features and frustration-relievers in this upgrade include new palettes and preferences, better zooming, and improved text-editing and -formatting. The program, while still not perfectly behaved, is stable, well designed, and full-featured. Jul 92

★★★ **Renaissance 1.0, Eastman Kodak, 800/433-2839, $69S.** A strange mixture of power and oversight, this page-design and -layout software provides several slick features, including handling multiple page sizes simultaneously, but blatantly ignores common Macintosh conventions, such as some keyboard shortcuts. Dec 92

★★★★ **Spectacular 1.2, FontHaus, 203/846-3087, $79.95.** Keep track of fonts efficiently and effectively with this type-specimen generator. Printing specimen sheets is a cinch. Jan 93

★★★ **Typestry 1.0, Pixar, S10/236-4000, $299.** Type enters the third dimension with this reasonably priced 3-D typographic effects and animation program. There's room for improvement, but it's an exciting tool for designers, multimedia producers, and those who enjoy working with type. Nov 92

◪ **TypeStyler (2.0), Broderbund Software, 41S/382-4400, $219.9S.** The 35 shapes of this product's library let you reshape PostScript or TrueType fonts to create decorative special effects such as arches and perspective. TypeStyler turns fonts into graphics, enabling you to stretch, compress, or rotate text, as well as add colors, grays, or patterns.

EDUCATION

★★★ **American Discovery 3.0, Great Wave Software, 408/438-1990, $49.9S.** Without glitzy graphics or sound, this educational game, intended mainly for classroom use, provides an excellent drill in geography, state capitals, and state facts. May 92

★★★ **The Castle of Dr. Brain 1.0, Sierra On-Line, 209/683-4468, $49.9S.** After applying for a job as a lab assistant with the local mad scientist, you must use logic and raw brain-power to navigate a series of rooms, mazes, and hallways on the way to your interview. Puzzles range from simple and mundane to creatively laborious. Dec 92

★★★ **Eco-Adventures in the Ocean, Eco-Adventures in the Rainforest 1.0, Chariot Software Group, 619/298-0202, $S9.9S.** Explore the ocean or rainforest while avoiding pitfalls and predators in these educational adventure games. Imaginary landscapes that combine features found in different environments may confuse some students. Nov 92

★★★ **Headline Harry and the Great Paper Race 1.0, Davidson & Associates, 310/793-0600, $59.95.** Travel through time and across the country as a journalist in this history/geography game. While not an educational masterpiece, it is lots of fun. Dec 92

★★★ **MacGlobe 1.3.0, Broderbund Software, 41S/382-4400, $S9.9S.** Besides maps and bits of fun, such as national anthems, this geography software offers an impressive quantity of demographic and economic information. While it could stand some improvement in data export, it provides a fascinating intellectual adventure for home and school use. Feb 93

★★ **Math Shop, Math Shop Jr., Advanced Math Shop 1.0, Scholastic, 800/S41-5S13, $24.9S.** The humdrum workbook format is converted into bits and bytes with these mathematics education games. May 92

★★ **NihongoWare, Vol. 1, Qualitas Trading Company, S10/848-8080, $623.** Although this Japanese language CD ROM offers solid instruction, it's so expensive and so limited in its word selection that it's not an economical choice for individual users. Jan 93

★★★★ **Number Munchers 1.1 (1.2), MECC, 612/S69-1S00, $29.9S to $69.** Fun, educational game builds arithmetic skills through arcade action. Munchers gobble your choice of multiples, factors, primes, equalities, and inequalities, but the game can't accept custom data sets. Jun 92

★★ **Picture It 1.0 (1.4), Penton Overseas, 619/431-0060, $69.9S.** If you add custom word lists, this interactive French-English picture dictionary may serve as a decent aid to a more complete curriculum, but it's buggy and of uneven quality. Aug 92

★★★ **StudyWare for the SAT 3.7N (4.0), Cliffs Notes, 402/423-5050, $49.9S.** Four full SATs, a TSWE (Test of Standard Written English), and a series of drills are included with this inexpensive SAT-training program. It doesn't provide a lot of tutorial assistance, but may be appropriate as a quick brushup. Jun 92

★★★★ **Super Munchers 1.0, MECC, 612/S69-1S00, $49.9S to $69.** From a kid's point of view, this educational arcade game offers long-lasting appeal. The player maneuvers a cartoon Muncher around a game board, gobbling up words that fit target rules, such as Romantic composers or European countries. Jun 92

★★★ **Time Treks 1.0, Earthquest, 415/321-S838, $S9.9S.** An eccentric archaeologist opens portals through time, and you must close them in this educational, HyperCard-based game. Slow response time and limited animation and color are somewhat disappointing, but overall it's a fun way to browse through history. Sep 92

★★★★ **Transparent Language 1.04M, Transparent Language, 603/46S-2230, $139.** Without an iota of glitz or glamour (no sound, graphics, color, or buttons), this foreign-language reader is a superb tool for bolstering language skills through reading. Oct 92

★★★★ **Where in the World Is Carmen Sandiego? Deluxe Edition, Broderbund Software, 41S/382-4400, $79.95.** The V.I.L.E. gang is at it again, stealing famous objects and fleeing to locations around the world. In this deluxe version of the well-known geography game, there are more crooks, more clues, and more countries to visit. Oct 92

★★★★ **Word Munchers 1.0 (1.2), MECC, 612/S69-1S00, $29.9S to $69.** Munch the words with matching vowel sounds in this educational game for grades 1 to 5+. Dazzling color graphics stand out, but the repetitive cartoon sequences get tiresome. Jun 92

★★★ **World Atlas 1.2, Software Toolworks, 41S/883-3000, $79.9S.** Extensive, detailed maps of countries and regions are the highlight of this atlas software. In addition, descriptive headings report interesting text-based demographic data. Apr 92

ENTERTAINMENT

★★★ **4-D Boxing 1.0, Electronic Arts, 415/S71-7171, $49.9S.** Authentic motion and multiple viewing angles are the best features of this entertaining boxing

continues

Star Ratings

game, but off-disk copy protection, geometric figures, and the inability to save games in progress make it less enticing. Sep 92

★★★ **Audioshop 1.0 (1.03), Opcode Systems, 415/856-3333, $89.95.** Audiophiles will get a kick out of applying sound effects to any sound file on their Macs. You can also control the order of songs or sounds on an audio CD played on a CD ROM player. A number of quirks may confuse new users. Sep 92

★★★ **The Battle of Britain, Deadly Games, 215/295-2284, $54.95.** It's August 10, 1940. The badly outnumbered British must defend their country against the invading Luftwaffe, and you're in charge. Although the graphics and sound are not spectacular, this is an entertaining, thinking person's game. Dec 92

★★★ **Blade 1.1, Leviathan Corp., 313/826-3560, $99.95.** Surreal graphics in this fantasy martial-arts game are spectacular—a cross between Dali and Seuss—but the arcade action is extremely difficult to master. Sep 92

★★★ **Capitalist Pig 1.0 (1.02), Pluma Software, 602/969-9441, $59.95.** Terrorist attacks, embezzlement, fires—keeping a cool head is half the challenge if you are to become successful in this business-simulation game. No clear end point means that getting rich, retiring, and writing novels is not an option. Sep 92

★★★ **The Complete Annotated Alice 1.0, The Voyager Company, 310/451-1383, $19.95.** Fans of *Alice's Adventures in Wonderland* will love the "lost" out-of-print chapter in this HyperCard book designed primarily for PowerBook users. As literary hypertext hide-and-seek, it works. Jun 92

★★ **Creepy Castle 1.0, Reactor, 312/573-0800, $49.95.** Wolfman, the Bride of Frankenstein, and other ghouls from classic horror movies populate this clever arcade-style game. Still, delightful movie trivia doesn't compensate for frustrating performance delays and limited scenarios. Jun 92

★★★ **Cross Country 1.0 (2.0), T-34 Microsystems, 904/396-2785, $179.95.** No unnecessary frills complicate this efficient, inexpensive instrument-flight trainer. It doesn't have a true aerodynamic feel, but that flaw's not critical. Jul 92

★★★ **Cyberblast 2.01, Innerprise Software, 410/560-2434, $49.95.** Aliens have overrun the 64 levels of Fastrax Labs, and it's your job to get rid of them in this arcade game. While it's not the most unusual game in the universe, it's a nice, basic shoot-'em-up, with clever execution and appealing graphics. Sep 92

★★★★ **Go Master 5, Toyogo, 808/396-5526, $69.** Go has been called the most interesting board game ever invented. This excellent software version incorporates helpful learning aids and sample games. Dec 92

★★★★ **HardBall II, Accolade, 408/985-1700, $54.95.** From the pitcher's windup to the batter's swing, this baseball game comes astonishingly close to natural human motion. The upgrade adds more teams, more stadiums, instant replay, and the ability to create your own league. May 92

★★★★ **Insanity 1.0, UV Wave, 318/868-9944, $28.95.** Shoot your Mac with this cool control panel device that offers a choice of nine weapons, ranging from an Uzi to a pigeon. It has first-rate sound effects and detailed animation, but the novelty wears off. Feb 93

★★★★★ **Just Grandma and Me, Broderbund Software, 415/382-4400, $49.95.** Mercer Mayer's Little Critter comes to life in this charming, captivating, wondrously entertaining, interactive storybook on CD ROM. Aug 92

◪ **Kid Pix 1.0 (2.0), Broderbund Software, 415/382-4400, $59.95.** An entrancing, enchanting color paint program aimed at children but delightful for grown-ups, too. Hilarious sounds, hidden surprises, spectacular effects, zany and creative tools—it's a classic.

★★★ **Kid Pix Companion, Brøderbund Software, 415/382-4400, $39.95.** Addition to Kid Pix adds clever new features, including the world's easiest-to-use QuickTime movie and presentation modules, but it's less appealing than the delightfully simple original. Oct 92

★★★ **Nobunaga's Ambition 1.0, Koei Corp., 415/348-0200, $59.95.** Visit the Warring States period of feudal Japan, unify the country, and usher in an era of peace. Strategy game is absorbing and challenging, but the interface can be annoying. Jun 92

★★★★ **Patton Strikes Back: The Battle of the Bulge, Brøderbund Software, 415/382-4400, $19.95.** Military simulation game with superior graphics is simple to learn and satisfyingly complex. If only they'd skipped the off-disk copy protection. Jun 92

★★★★ **Poetry in Motion, The Voyager Company, 310/451-1383, $29.95.** Performance videos of contemporary poets are juxtaposed with the texts of their poems and taped interviews in this intriguing CD ROM that combines the excitement of the stage with the reflective appeal of the page. Feb 93

★★★★ **Prince of Persia, Brøderbund Software, 415/382-4400, $49.95.** A high tolerance for frustration is necessary to negotiate the 12 mazelike levels of dungeon and palace in this arcade adventure, but amazingly realistic (although gory) animation, stunning graphics, and entertaining challenges make it all worthwhile. Sep 92

★★★ **Red Baron 1.0, Dynamix, 800/326-6654, $69.95.** The romance of history and the realism of a flight simulator combine in this World War I flight game. Despite small annoyances, including too many dialog boxes to get to the simulation, this game will charm any aspiring ace. Nov 92

★★★★ **The Secret of Monkey Island 1.0, LucasArts Games, 415/721-3300, $59.95.** A genuinely amusing, interactive tale of swashbuckling and daring deeds using splendid 256-color graphics and an original sound track. Low screen resolution and irksome copy protection only slightly spoil the delight. Sep 9

★★★★ **Shanghai II: The Dragon's Eye, Activision, 310/207-4500, $49.95.** Classic tile game is more addictive than ever; flashy enhancements include new tiles and layouts, plus an additional, entirely new game that's a variation on the tile-removal theme. May 92

★★ **Sherlock Holmes, Consulting Detective 1.0, Icom Simulations, 708/520-4440, $69.95.** Accompany Sherlock Holmes and Watson as they investigate three CD ROM–based mysteries. Primarily made up of video scenes, this game's only slightly more interactive than TV, and the picture's not as good. Aug 92

★★★★ **A Silly Noisy House 1.0, The Voyager Company, 310/451-1383, $59.95.** A brightly colored animated world awaits exploration; this CD ROM's simple scenes and syrupy songs are perfect for preschoolers. May 92

★★★★ **SimAnt 1.0, Maxis, 510/254-9700, $59.95.** Marauding red ants, ant lions, spiders, even power mowers—an ant's life is likely to be short in this remarkably detailed simulation game in which the object is to have black ants amass territory in a suburban backyard. Apr 92

★★★ **SimLife, Maxis, 510/254-9700, $69.95.** A megalomaniac's dream come true, this amazingly intricate simulation game allows players to create and control ecosystems. It's not easy, but the reward is an increased understanding of the complex interrelationships of life. Feb 93

★★★★ **So I've Heard, Volume 1: Bach and Before, The Voyager Company, 310/451-1383, $24.95.** Engaging text by classical-music critic and lecturer Alan Rich describes nearly two millennia of western music (up to the mid-eighteenth century) in this CD ROM. It offers a unique and affordable opportunity to sample 50 or so performances, styles, and compositions. Feb 93

★★★★ **Spaceward Ho 2.0.1, Delta Tao Software, 408/730-9336, $59.** A happy planet is a profitable planet in this absorbing, humorous strategy game of interstellar capitalism and imperialism. Aug 92

★★★★ **Spectre 1.0, Velocity Development Corp., 415/776-8000, $59.95.** Fight enemy tanks in a 3-D arcade game that is at once basic and extremely addictive. When installed on a network, it's one of the great antiproductivity tools of all time. May 92

★★★★ **Spelunx and the Caves of Mr. Seudo, Brøderbund Software, 415/382-4400, $49.95.** Unanticipated giggles, rich graphics, entertaining sounds, and creative learning activities fill this interactive hyperworld. We recommend it, despite its tiny bugs. Jul 92

★★★★ **Super Tetris, Spectrum HoloByte, 510/522-3584, $49.95.** Teensy tiles are a very minor negative in this exceptional tile game that's more varied, more challenging, and more forgiving than the original. Oct 92

★★ **Surgeon 3, The Brain 1.0 (1.1), ISM, 410/560-0973, $59.95.** Surgical-simulation game with realistic graphics and sound can be entertaining and educational, but it's overly intolerant of mistakes—not for the faint of heart or the easily frustrated. Sep 92

★★★ **Warlords, Strategic Studies Group, 904/494-9373, $59.95.** A medieval fantasy world is the setting for this colorful game of strategy and conquest with beautiful graphics. Unfortunately, the computer opponents are not challenging enough for an experienced war-gamer, although human opponents may be. Dec 92

★★★★ **Wordtris, Spectrum HoloByte, 510/522-3584, $49.95.** Tetris's falling blocks are letters in an arcade game for Scrabble lovers. Lots of variations, including modes for children, tournaments, and head-to-head play on a network, make it a super game. Jun 92

GRAPHICS

◪ **Adobe Illustrator 3.01, Adobe Systems, 415/961-4400, $695.** Adept transformation and reshaping capabilities and superb text-handling stand out in this object-oriented illustration program. It also includes features found in no other Macintosh draw program, such as tools to create line and bar graphs.

◪ **Adobe Photoshop 2.0.1 (2.0.1), Adobe Systems, 415/961-4400, $895.** With complete mastery of the bitmapped, continuous-tone environment, this product

is the industry standard for image manipulation. Although it's not perfect, it's so good that if you make your living in graphic art, it's worth the price of a Mac itself.

★★★ **Aldus FreeHand 3.1, Aldus Corp., 206/628-2320, $595.** A pressure-sensitive freehand tool is the most remarkable new feature of this updated drawing program. Substitution for missing fonts is another good addition, but skimpy text-editing tools and incomplete support for EPS continue to diminish its value. Jun 92

★★ **Aldus Gallery Effects 1.0 (1.5), Aldus Corp., 206/628-2320, $199.** Uninspiring collection of 16 image-editing filters has an unusually strong manual. Apr 92

★★★ **Alias Sketch 1.0.2 (1.5), Alias Research, 800/447-2542, $995.** The unique collection of tools makes this the only program that allows you to sit down and play with 3-D rendering. Failings include quirky navigation and sluggish performance. Aug 92

★★★★ **ArchiCAD 4.02 (4.1), Graphisoft USA, 415/737-8665, $4450.** The simple yet powerful 3-D interface in this CAD package builds on a construction metaphor. The integrated product incorporates most of the features an architect needs. Jun 92

★★ **AutoCAD Release 11, Autodesk, 415/332-2344, $3500.** Customizable, bare-bones drafting upgrade partially implements a graphical user interface. Few add-ons are currently available. Dec 92

★★★ **CA-CricketDraw III 1.0, Computer Associates International, 408/432-1727, $249.** Although not revolutionary, this draw program boasts some original implementations, including dramatically improved gradations. May 92

★★★ **Cachet 1.0, Electronics for Imaging, 415/742-3400, $595.** The tools, interface, output, and documentation of this color-image editor are all quite impressive for a first version, but serious failings include slowness and disappointing sharpening. Dec 92

◪ **Canvas 3.0 (3.0.6), Deneba Software, 305/596-5644, $399.** Discovering the complex nuances of this draw program's immense feature list isn't easy, but it's well worth the effort. The precision drawing functions in particular should appeal to many users.

◪ **Claris CAD, Claris Corp., 408/727-8227, $899.** Serious but basic CAD package has fallen behind the competition after a long period without an upgrade. Still, it's one of the fastest products available for scrolling and zooming—important for work on large, complex drawings.

★★★ **Color It 1.0 (2.0), MicroFrontier, 515/270-8109, $119.95.** A magic-wand tool and antialiased brushes and text are among the high-end features found in this low-end color paint program. Occasionally mystifying and buggy, it's still a remarkable bargain. Apr 92

★★★ **DesignCAD 2D/3D 3.0.1, DesignCAD, 918/825-4848, $299.95.** Despite slow rendering, this general-purpose 3-D modeler with 2-D drafting capabilities represents a price and performance breakthrough in 3-D modeling programs. Nov 92

★★★★ **ElectricImage Animation System 1.5.1, Electric Image, 818/577-1627, $7495.** The most powerful animation program for the Mac improves its documentation and rendering, and adds an intuitive project window that allows you to control all aspects of animation from a single location. Unfortunately, it still retails for the price of a European vacation for two. Feb 93

★★★★ **Expert Color Paint 1.0, Expert Software, 305/444-0080, $49.95.** A wonderful value for novices, this color paint program offers a tidy collection of features for an astonishingly low price. Beware of low memory settings, though, or it gets buggy. Jun 92

★★★★ **Fractal Design Painter 1.2, Fractal Design Corp., 408/688-8800, $349.** An expanded collection of paper textures and four new watercolor brushes add appeal to an already strong set of painting tools. Minor complaints include unsophisticated gradation and fill capabilities and an insensitive Undo command. Aug 92

★★★★ **Infini-D 2.0, Specular International, 413/549-7600, $995.** Rich combination of 3-D modeling, rendering, and animation tools at a relatively affordable price. Visualization program works well, offers a nicely integrated approach to rendering, and is generally stable. Jan 93

★★★★ **IntelliDraw 1.0, Aldus Corp., 206/628-2320, $299.** Crowd-pleasing features such as physical and dynamic links make this automated draw program a great environment for planning and presenting, although it's less satisfying as a free-form drawing tool. Nov 92

◪ **MacDraw Pro 1.0v1 (1.5), Claris Corp., 408/727-8227, $399.** The shallow array of integrated features in this draw program is perfect for the new or moderately experienced user, but compared with other programs in the same price range, it's slow and deficient.

◪ **MacPaint 2.0, Claris Corp., 408/727-8227, $125.** Easy-to-use black-and-white paint program takes up very little RAM, but it adds few capabilities beyond those it offered eight years ago.

◪ **MacRenderMan 1.0 (1.3), Pixar, 510/236-4000, $695.** This dedicated renderer provides an extremely sophisticated, albeit sometimes difficult, way to generate 3-D images. Currently the most widespread rendering scheme, it uses algorithms to create textures, bumps, lights, fog, and practically every other element of an image.

★★★★ **Ray Dream Designer 2.02 (2.04), Ray Dream, 415/960-0765, $895.** Experienced 3-D aficionados will find this 3-D–imaging software a welcome addition to their arsenal, and beginners may find it ideal for the leap from two dimensions to three. Improved text-handling and viewing capabilities would make it even better. Sep 92

★★★ **ScanMatch 1.01 (1.02), Savitar, 415/243-3030, $199.** Basically half a color-calibration system. Software quickly and easily adjusts color scan files for screen display, with somewhat uneven results; those wishing to adjust images for print purposes need to use another application. May 92

★★★ **Showplace 1.1 (1.1.1), Pixar, 510/236-4000, $695.** Straightforward graphics application organizes shading and rendering processes into five basic components. Beginners will like the simple interface, but the feature set is small for experienced users. Jun 92

★★★★ **Sketcher, Fractal Design, 408/688-8800, $149.** A variety of effects reproduce the styles and techniques of traditional drawing tools with this wonderful gray-scale paint and image processing program. Feb 93

★★★★ **Smoothie 1.02, Peirce Software, 408/244-6554, $149.** Create smoother screen images with this handy utility that antialiases the edges of on-screen artwork. Although it can't accommodate sound or accept imported QuickTime movies, it's a must for anyone who uses a Mac for presentations. Nov 92

◪ **Swivel 3D Professional 1.0 (2.0), Macromedia, 415/252-2000, $695.** Relatively unusual cross-sectional technique makes this 3-D modeler a great tool, especially for fast prototyping. It provides a quick and easy way to create a variety of shapes.

★★ **Zeus 0.91 (0.92), Delta Tao Software, 408/730-9336, $499.** Color paint program tries hard to match capabilities found in more expensive programs, but not always successfully. It's brimming with good ideas that are poorly implemented. Aug 92

MATH/SCIENCE

★★★ **Caduceus Physics 1.0, Scientia, 617/776-3427, $159.95.** Giant HyperCard stack consists of carefully indexed cards covering small conceptual bites of physics; it's the first in a series of programs designed to prepare students for the Medical College Admissions Test (MCAT). Jan 93

◪ **Data Desk 3.0, Data Description, 607/257-1000, $595.** Users with limited formal backgrounds in statistics can perform better analyses with this statistics program than with others.

★★★★ **Entrypaq 3.0, Albathion Software, 415/824-2737, $149.95.** Low-end expert-systems shell is an excellent teaching tool, but the slow performance and HyperCard interface rule it out for practical implementation. Nov 92

★★★ **Expert Astronomer 1.0, Expert Software, 305/444-0080, $49.95.** Draw maps of the sky from any location in the Solar System and learn about celestial objects with this astronomy software. Most effective in color, this is a great educational tool for beginners and a reference database for experts. Dec 92

★★★★ **HiQ 1.0 (1.1), Bimillennium Corp., 408/866-2010, $695.** A script language, which exhibits an endearing nonchalance about data structures and typing of variables, is only one of the impressive features of this formidable numerical mathematics software. Oct 92

★★★★ **Interactive Physics II 1.0 (1.01), Knowledge Revolution, 415/553-8153, $399.** Motion simulation software is an improvement over traditional classroom instruction in physics. This new version greatly expands the range of problems that can be solved, and adds support for QuickTime. Dec 92

◪ **JMP 2.0 (2.05), SAS Institute, 919/677-8000, $695.** You get lots of value for your money with this statistical-analysis program and its vast assortment of functions, including strong classical statistics and visualizations, 3-D spin features, quality-control statistics, and a manual that is a model of concise clarity.

★★★★ **MacBreadboard 1.1, Yoeric Software, 919/644-1620, $59.95.** Useful educational engineering software simulates with excruciating detail every aspect of a digital integrated-circuit breadboard trainer. It accurately replicates and even surpasses the behavior of a physical breadboard—without burning out IC chips. Dec 92

★★★★ **Maple V, Brooks/Cole Publishing, 800/354-9706, $450.** For functional scope and ease of use on a basic Mac (such as a Classic or Plus), this symbolic math software has no competitors. May 92

◪ **Mathematica 2.0 (2.1), Wolfram Research, 217/398-0700, $595.** While its memory demands are

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high, this symbolic-math program offers a truly vast array of functions, including over 800 numerical and symbolic routines. The quality and quantity of its support literature are outstanding.

★★★ **Minitab 8.2, Minitab, 814/238-3280, $695.** These statistical-analysis tools are broad but not exhaustive. Still, they're easy to learn and easy to use, making Minitab an excellent teaching tool. The graphics and output are unfortunately typewriter-like. Jun 92

★★ **NueX 1.1 (1.3), Charles River Analytics, 617/491-3474, $295.** Lightweight introduction to artificial neural networks and knowledge-based expert systems has some merit, but cannot be considered a serious production tool. Oct 92

★★★★ **Sequencher 2.0, Gene Codes Corp., 313/769-7249, $2200.** While not implementing everything a DNA researcher could want, this software for manipulating DNA-sequence information does provide the things a researcher really needs. The single best feature is its raw speed. Dec 92

★★★ **SigmaPlot for the Macintosh 4.11, Jandel Scientific, 415/924-8640, $495.** It's a short path from raw data to publishable graphs with this scientific graphing software. The Mac fundamentals need polish, but the program offers unique analytic capabilities. Jul 92

★★★ **Simulink 1.2, The MathWorks, 508/653-1415, $3995.** If you hear the word *Bode-plot* several times a week at work, this math-simulation software is designed to make your life wonderful. Little glitches and a command-line orientation are drawbacks. Dec 92

★★★ **StatView 4.0m, Abacus Concepts, 510/540-1949, $595.** A nice mix of statistical prowess and operating convenience distinguish this statistical-analysis and presentation software. The printing options are outstanding. Nov 92

★★★★ **TeMath 1.0, Brooks/Cole Publishing, 800/354-9706, $39.95.** For roughly the price of a textbook, this mathematical-exploration software provides all the help a student needs to understand what's really happening in differential and integral calculus. Apr 92

ORGANIZATION/PRODUCTIVITY

★★ **ACT 1.0, Contact Software International, 214/919-9500, $395.** While this contact manager has several laudable features, such as customizable contact views and an integrated word processor, learning how to use it is a frustrating experience. Feb 93

★★★ **Active Memory 2.0, ASD Software, 714/624-2594, $199.** Personal organizer distinguishes itself by providing strong network support, although it may be overkill for a lone user. Aug 92

◪ **Address Book Plus, PowerUp Software, 415/345-5900, $99.95.** What you see is what you get with this field-based address-book software that sorts, selects, formats, and prints names and addresses in every conceivable way. The disadvantage is that the product is slow, especially with more than 200 addresses in a file.

★★★★ **Agent DA 2.0 (2.1.1), TeamBuilding Technologies, 514/278-3010, $129.** Simple, flexible calendar/reminder program includes every obvious calendar function—easy navigation, extensive print options, adjustable displays, recurring events, and even a straightforward manual. Sep 92

★★★ **Amaze Daily Planners: Cathy, The Far Side, Word-A-Day (2.0/1993), Amaze, 206/820-7007, $59.95.** A cartoon (or word) a day makes scheduling more fun with these icon-based calendar/daily planners, but the graphics take up a lot of hard drive space, and the programs must be running in order for alarms to sound. Sep 92

★★ **Connections 2.1, Concentrix Technology, 415/358-8600, $199.** A wider range of scheduling features, new printing options, and improved networking capabilities don't change the fact that this HyperCard-based personal information manager is just too slow. Nov 92

★★★★ **DateBook 1.5.1, After Hours Software, 818/780-2220, $125.** Personal time manager offers a flexible approach to event scheduling and to-do-list management. This upgrade adds new features and fixes bugs that plagued the first version. Feb 93

★★★ **DayMaker 1.01 (2.0), Pastel Development Corp., 212/941-7500, $99.95.** In spite of a few rough edges and missed opportunities, this personal organizer is a versatile tool for creating to-do lists, prioritizing tasks, and maintaining a calendar with alarms. Apr 92

◪ **Dynodex, Portfolio Systems, 408/252-0420, $89.95.** Raw speed is the trade-off for an unappealing screen display with this field-based address-book software. It's fast enough in searching, opening, and saving to be a worthwhile investment.

★★★ **EasyAlarms 2.0.3, Essential Software, 914/889-8365, $99.** Complex, flexible calendar, reminder, and to-do list program includes scripting and sound recording among many other features. Nov 92

★★★★ **First Things First 2.0 (3.0), Visionary Software, 503/246-6200, $69.95.** The nifty on-screen clock that floats serenely above your windows is the most appealing feature of this good but basic event-reminder utility. Apr 92

★★ **Hello, Atelier Systems, 415/285-1233, $99.** Unusual combination of contact management and word processing in a compact package. This first release is hampered by several notable flaws, such as text documents that must be linked to a contact name. Jan 93

★★★★ **In Control 1.0 (1.1), Attain Corp., 617/776-1110, $129.95.** Shrink an immense list down to a bare skeleton and expand it again using this to-do-list manager's clean interface and collapsible row-and-column format. May 92

★★★★ **Inspiration 4.0, Inspiration Software, 503/245-9011, $295.** Watch your ideas evolve in a dynamic diagram mode and a text-based outline mode with this brainstorming tool. It works best as a vehicle for organizing and developing ideas. Feb 93

★★★ **Intouch 2.0.4, Advanced Software, 408/733-0745, $99.95.** Free-form database is a fast and easy way to manage contact information. Program offers flexible data entry instead of automatic formatting. Although this version adds a handy reminder system, it falls short as a calendar planner. Feb 93

★★★ **Nolo's Personal RecordKeeper 3.0, Nolo Press, 510/549-1976, $34.96.** Hierarchically configured database organizes your personal affairs, including legal matters, financial records, insurance plans, family history, and more, but it is frustratingly inflexible. Jan 93

★★★ **Now Up-to-Date 1.0.1, Now Software, 503/274-2800, $99.** The swift performance and logical structure of this network calendar program make it easy to use, but deficiencies, such as the lack of a to-do-list function, are frustrating. Oct 92

★★★ **TouchBase 2.0 (2.0.1), After Hours Software, 818/780-2220, $125.** Entering data is quick and easy, and there are lots of useful printing options, but this personal information manager displays a few rough edges, such as not allowing you to copy the information in the Record Summary field. Aug 92

PRESENTATION TOOLS

★★★★ **Action 1.0, Macromedia, 415/252-2000, $495.** Entry-level multimedia integration program offers, for its price, a rich selection of features, including an excellent variety of transitions as well as gradient and patterned backgrounds. It makes producing presentations with sound and motion surprisingly easy. Feb 93

★★★★ **Adobe Premiere 2.0, Adobe Systems, 415/961-4400, $495.** A dream command post for video professionals, this QuickTime movie–editing software produces stunning special effects with little effort. Only the program's appetite for memory, disk space, and computer horsepower prevent it from being the nonprofessional's dream as well. Jan 93

◪ **Aldus Persuasion 2.1 (2.12), Aldus Corp., 206/622-5500, $495.** For slide presentations, this product provides an all-in-one studio where each element—outline entries, slides, notes, handouts, and charts—is dynamically linked to the others. It offers layered builds and automated templates, and has a proven track record.

★★★★ **Animation Clips 1.0, Media In Motion, 415/621-0707, $99.** Spice up a presentation with an animated stapler, a jukebox that's a work of art, or any of 58 other customizable animations from these business-oriented packages. Marred only by some choppiness and a few lesser-quality animations. Jun 92

★★★★ **CameraMan 1.0 (1.1), Vision Software International, 408/748-8411, $149.** If you need to record continuous screen operations, this screen recorder is the best deal around. It handles 32-bit QuickDraw, takes advantage of QuickTime's long list of compression and playback capabilities, and even uses custom frame sizes. Sep 92

★★★ **Cinemation 1.0, Vividus Corp., 415/494-2111, $495.** Easy-to-use program merges animation, interactivity, and presentation features, but the image- and text-handling capabilities are less than stellar. Jul 92

★★★ **DiVA VideoShop 1.0, DiVA Corp., 617/491-4147, $599.** Instantaneous playback sets this graceful QuickTime editing software apart. Its simple beauty is slightly offset by a few rough edges, a lousy manual, and an occasionally clumsy interface. Jul 92

◪ **HyperCard 2.1, Claris Corp., 408/727-8227, $199.** Ease of use has made this multimedia-authoring software a tool for the masses. Although color is awkwardly implemented, more add-on products have been developed for this than for any other multimedia program.

★★★ **MacroMind Director 3.1, Macromedia, 415/252-2000, $1195.** This minor update to a powerful and versatile multimedia authoring tool adds 23 scripting commands, QuickTime importing and editing, and a utility that compiles movies into a faster playback format—but the whopping $149 addition to the price makes it an upgrade most users can afford to miss. Feb 93

★★★ **Magic 1.0 (1.1), Macromedia, 415/252-2000, $395.** Outstanding editing features make this multimedia-presentation software easy to master. Many of the features of more-complex programs are missing, but what it does, it does well. Aug 92

★★★★ **Microsoft PowerPoint 3.0, Microsoft, 206/882-8080, $495.** This remarkable upgrade puts this presentation program ahead of the pack in terms of convenience and ease of use. Although the ready-made template collection is pretty paltry, the extensive system of master layers, reliable cross-platform compatibility, and strong on-screen presentation capabilities more than compensate. Feb 93

★★★ **Morph 1.0, Gryphon Software Corp., 619/454-6836, $149.** With patience and practice, you can become a high-tech special-effects wizard using this image-melding movie utility that "melts" one image into another. While using it is simplicity itself, you can only morph still images, and the program suffers from some first-release glitches. Nov 92

★★ **Motion Works ProMotion 1.0 (1.02), Motion Works, 604/685-9975, $395.** Inexpensive animation program consolidates a slew of tempting features, including flexible path tools and ambitious support for Apple events, but the capabilities are strung together with a weak and problem-ridden interface. Nov 92

PROGRAMMING

★★★ **EdScheme 3.4, Schemers, 305/776-7376, $49.95.** This clear, elegant programming language is an excellent tool for learning good programming techniques, although it can't be used to create stand-alone applications. Nov 92

★★★★ **Object Master 1.0.2, ACIUS, 408/252-4444, $395.** Successful combination of the superior object-management facilities typically found in Smalltalk as well as a first-rate programmer's editor. Plus it works with the most popular languages: C, C++, and Pascal. Jan 93

★★★★ **Prograph 2.5, TGS Systems, 902/455-4446, $495.** Elegantly designed, object-oriented development environment simplifies Macintosh programming. The graphics-based program is conceptually more advanced than traditional object-oriented programming. Jun 92

★★★ **Serius Programmer 3.0, Serius Corp., 801/261-7900, $395.** The graphical interface of this application-design environment provides nonprogrammers with tools for creating custom software, but the documentation lacks critical explanations. Jan 93

★★★★ **Think C 5.0, Symantec Corp., 408/253-9600, $299.** Although not a radical improvement, this is a significant upgrade to an outstanding development tool. Beginners won't find the documentation helpful. Jul 92

★★★★★ **Think Pascal 4.0, Symantec Corp., 408/252-3570, $249.** A remarkable achievement—a programming language and environment full-bodied enough for professional programmers while still inviting for neophytes. No weak points and dozens of strengths. Aug 92

★★★★ **UserLand Frontier 1.0 (2.0), UserLand Software, 415/369-6600, $249.** A robust scripting language distinguishes this ground-breaking desktop programming tool that can automate desktop functions, repetitive data-managements tasks, and more. Scripts can only be used on computers with copies of the program. Jul 92

UTILITIES

After Dark 2.0, Berkeley Systems, 510/540-5536, $495. Turn your screen into an aquarium or a view of a night skyline with this whimsical screen saver that includes more than 30 different modules.

★★★ **ALSoft Power Utilities 1.0.1 (1.0.2), ALSoft, 713/353-4090, $129.95.** Buying this set of seven utilities is more economical than purchasing the included disk optimizer and resource manager (DiskExpress II and MasterJuggler) separately, but the other five utilities are unimpressive. Aug 92

★★★ **AutoDoubler 1.0.7 (2.0), Salient Software, 415/321-5375, $79.95.** Designed to operate transparently, this automatic file-compression utility is a practical solution for users short on disk space, but it's missing many of the features of dedicated file-compression utilities, and it provides only limited control over the process. Sep 92

★★★ **BetterWriters 1.0.1 (1.0.3), GDT Softworks, 604/291-9121, $69.** Smart drivers teach your ImageWriter, StyleWriter, or DeskWriter laser printer tricks, letting it perform printing gymnastics such as inverting images and adding a variety of options for improving output. Minor incompatibilities with some common applications are inconvenient. Jul 92

★★★★ **Citadel with Shredder 1.0 (1.1), Microcom, 919/490-1277, $149.95.** Simple, convenient set of system-security tools covers all the bases, including password protection, encryption, permanent erasure, and more. Jun 92

★★ **Crash Barrier 1.0.1 (1.1), Casady & Greene, 408/484-9228, $79.95.** Control panel device is supposed to intervene during system crashes. It's a great idea but only works for certain types of crashes. Apr 92

DiskDoubler 3.7 (3.76), Salient Software, 415/321-5375, $79.95. With its impressive safety features, extremely tight compression, and respectable speed, this file-compression utility is a must-have for anyone who could use more hard drive space.

★★★ **DiskFit Pro 1.0 (1.1), Dantz Development Corp., 510/849-0293, $125.** Effective backup utility requires a time- and disk-consuming initial full backup, but subsequent incremental backups are simple and speedy. It does not support tape drives. Apr 92

★★★ **Drive 7 2.3, Casa Blanca Works, 415/461-2227, $79.95.** Universal hard drive updater and formatter has an attractive, uncluttered interface that's so easy to use it makes hard drive maintenance almost relaxing. Jan 93

★★★★ **easyPrint 1.0, SF/O, 402/291-0113, $29.95.** Nifty utility lets you switch printers without using the Chooser. It's a bargain for network users and those who frequently change output devices. Oct 92

Exposure Pro 1.0.2 (1.02), Baseline Publishing, 901/682-9676, $139.95. A floating palette in this screen-capture utility lets you edit your screen shots before you save them. It's a clever idea for those who don't own a paint program, but it creates only 72-dpi bitmaps.

★★★ **Fastback Plus 2.6 (3.0), Fifth Generation Systems, 504/291-7221, $189.** Even the most hardened shirker should be inspired to back up by the marvelously simple interface of this software. One warning—memory shortages can cause it to quit unexpectedly when running in the background. Apr 92

★★★★ **FolderBolt 1.02 (1.02c), Kent Marsh, 713/522-5625, $129.95.** Three designated levels of folder protection, plus flexible options for password-handling, among other actions, are the assets of this utility. File encryption, however, is not included. Jun 92

★★ **Gofer 2.0, Microlytics, 716/248-9150, $79.95.** Poky processing time is the trade-off for flexible text-search options without indexing by this file-finding utility. Our reviewer vetoed the trade. Jun 92

★★★ **HAM 1.0, Microseeds Publishing, 203/435-4995, $79.95.** Apple-menu enhancer adds submenus, allows reordering, and includes a folder of recently opened items in your Apple menu. Apr 92

★★★ **Hard Disk ToolKit Personal Edition 1.1.2, FWB Software, 415/474-8055, $79.** The more arcane features of the heavy-duty Hard Disk ToolKit have been stripped out of this entry-level, non-power-user version, but everything you really need to format, update, partition, and manage your hard drive is still included. Jan 93

★★★★ **Kiwi Power Menus 1.0, Kiwi Software, 805/685-4031, $39.95.** Simple little utility adds flexibility to the Apple menu by adding an unlimited number of submenus and enabling you to change the font and size in the menus. Dec 92

★★★ **Kiwi Power Windows 1.5 (1.5.2), Kiwi Software, 805/685-4031, $79.95.** Our skeptical reviewer found this system extension surprisingly handy. Its hierarchical menu lists all the open windows in the Finder and any applications. Jul 92

★★★ **MacPalette II 2.2, Microspot USA, 408/253-2000, $69.** You can print images from 8-bit and 24-bit color programs when you use an ImageWriter II with a four-color ribbon and this new driver that approximates halftones by dithering. While the results are less than state-of-the-art, so is the cost. Sep 92

★★★★ **MacTools 2.0, Central Point Software, 503/690-8090, $149.** The consistent, 3-D–style interface makes it easy for the inexperienced user to navigate this utility package; the automated hard drive and floppy-disk repair capabilities and antivirus capabilities make it an asset for anyone. Oct 92

★★★★ **Magnet 1.0, No Hands Software, 415/321-7340, $129.95.** Automation aids the laborious task of file management with this software. It creates "agents" or "magnets" that trigger in response to user-specified events and automatically look for files and folders to copy, move, or alias. Feb 93

★★★★ **MasterFinder 1.2.1, Olduvai Corp., 305/670-1112, $149.** Ingenious finder utility provides rapid access to frequently used files and folders, permits operations on several files at once, and saves catalogs of offline volumes, but the many features require some effort to learn. Nov 92

★★★ **More Disk Space 1.1 (1.2), Alysis Software Corp., 415/566-2263, $39.95.** Automatically compress and expand files with this utility. Although it doesn't identify compressed files, and must run as a start-up application to work automatically, it does offer a measure of control that similar utilities lack. Sep 92

★★★ **NightWatch II 2.0.1b, Kent Marsh, 713/522-5625, $159.95.** Although skillful snoops can override the screen-locker feature of this hard drive security utility,

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the password protection provides a flexible and safe method of restricting access to anyone turning on your hard drive. Nov 92

★★★★ **Nok Nok 1.0 (1.0.3), Trik, 617/933-8810, $49.95.** Plug the security holes that System 7 file sharing created, with this effective file-share monitoring utility that logs people's attempts to connect to your Mac, alerts you when someone does connect, and sets time limits for file share users. Oct 92

★★★★ **Norton Utilities for Macintosh 2.0, Symantec Corp., 310/453-4600, $149.** Everything-including-the-kitchen-sink utility package does an excellent job of diagnosing and repairing damaged hard drives and floppy disks, but the interfaces of the various components differ wildly. Oct 92

◪ **Now Utilities 3.0.2 (4.0.1), Now Software, 503/274-2800, $149.** Despite minor imperfections, this collection of utilities, including ten separate programs and a variety of sample and support files, provides lots of highly polished bang for your buck.

★★★ **On Location 2.0.1, On Technology, 617/876-0900, $129.95.** Fast file-finding utility with improved functionality shows formatted files, and updates index in background. Alas, the initial indexing is time-consuming, and the search functions are incomplete. Jun 92

★★★ **Retrieve It 1.0, MVP Software, 415/599-2704, $129.** It's great that this nonindexed file-finding utility allows you to search by file name as well as by text, but it is definitely slower than indexed searching. Nov 92

★★★★ **Shredder 1.0.1, DLM Software, 619/453-4984, $69.** Permanently blitz your data with this quick and easy trash-management tool that writes over deleted data—in accordance with Department of Defense specifications—so that file-restoration programs can't bring it back. Jul 92

★★★ **Silverlining 5.4, La Cie, 800/999-3919, $149.** Extensive and detailed testing is only one of many advanced functions offered by this hard drive–management utility. The interface is lackluster and apt to confuse beginners. Jan 93

★★★★ **SnapBack 1.0, Golden Triangle Computers, 619/279-2100, $129.** For regular day-to-day backups, this network backup software is a great choice. Its strength lies in its simplicity and its easy-to-use, one-window interface, but it requires a dedicated hard drive. Dec 92

★★★ **SpeedyCD 1.2.2 (1.2.4), ShirtPocket Software, 602/966-7667, $70.** Get Info gets faster with this CD ROM–access accelerator that creates a database of files from a CD and puts it on your hard drive. If you regularly browse through the same CD ROM folders, this product might save you enough time for it to be worth the $70. Nov 92

★★ **SuperDuper 1.7, NeoConcepts, 408/899-4821, $79.** If you're sick of duplicating disks with the Finder, this utility is an acceptable alternative, but there are other utilities that are better, cheaper, and do the same thing. Nov 92

◪ **Symantec Antivirus for the Mac (SAM) (3.0.9), Symantec, 408/253-9600, $99.** No-holds-barred virus fighter monitors your Mac and alerts you when it sees suspicious activity. Advanced users and network managers will appreciate its customization features and extensive scanning options.

★★★★ **TimeLog 1.01 (1.02), Coral Research, 702/588-9690, $97.** Even jaded computer users will approve of the reporting options offered by this utility for recording program-usage information. No network features included. Jul 92

★★★★ **UpDiff 1.0, KyZen Corp., 609/354-3863, $169.** Innovative program compares two versions of a file, extracts the differences, and creates a difference file that is typically smaller than the original and can be used to update the older file. Dec 92

★★★ **Voice Navigator SW 2.3, Articulate Systems, 617/935-5656, $399.** Talk back to your Mac (if it has built-in sound input) with this speech-recognition software. Defining macros that respond to voice commands can be frustrating, but the product is a real boon for disabled users. Jan 93

★★★★ **Wallpaper 1.0.1 (1.0.2), Thought I Could, 212/673-9724, $59.99.** Terrific control panel device lets you design, edit, import, and display repeating patterns on your Mac's desktop. Comes with fun, creative predesigned patterns. May 92

★★★ **WindoWatch 1.52 (1.53), ASD Software, 714/624-2594, $149.** If your main concern is to track program and file use, this utility will handle the job nicely. Using it for time billing with numerous programs, however, may be a maintenance nightmare. Jul 92

★★★ **WonderPrint 1.0, Delta Tao Software, 408/730-9336, $59.** StyleWriters and DeskWriters produce halftones good enough for newsletters with this printing extension that improves the output of QuickDraw printers and accelerates printing of pictures on PostScript printers. Jan 93

★★ **Workspace 1.0, Ark Interface, 206/654-4127, $149.** Although this novel desktop replacement is an intriguing first step toward improving the Finder, not enough functionality was added to satisfy our reviewer. Jul 92

★★★ **Zephyr Palettes for PageMaker, Zephyr Palettes for FreeHand 1.0.2 (1.3), Zephyr Design, 206/324-0292, $79.95.** Exchange pull-down menus for palettes in PageMaker or FreeHand with these cleverly conceived, modestly priced utilities. A number of details could still be smoothed, but none are real stumbling blocks. Jul 92

VERTICAL MARKETS

★★ **ConstructionMac 1.2 (2.0), Revelar Software, 801/485-3291, $99.** With a lot of work from you, this software will organize your construction or remodeling project. Oct 92

★★ **The Desktop Lawyer, The Open University, 407/649-8488, $99.95.** The manual included with this collection of more than 300 legal-document templates provides an excellent overview of legal concepts; too bad the directions for filling out the forms are so unclear. Apr 92

★★★★ **Diet Balancer 1.0, Nutridata Software Corp., 914/298-1308, $69.95.** Easy-to-use personalized weight-planning tool includes a database of nutritional values and standard serving sizes, and is useful for home diet-planning. Dec 92

★★ **Expert Landscape Design, Expert Software, 305/567-9990, $49.95.** Bare-bones drawing environment for experimenting with landscape design is inexpensive, but its usefulness is severely limited because of awkward color and pattern tools and because it doesn't identify plant types. Feb 93

★★★★ **Grade Machine 5.0, Misty City Software, 206/828-3107, $79.** Teachers' lives get easier with this software that quickly sets up a useful electronic grade book. Program includes networking capabilities plus dozens of options for printing reports. Dec 92

★★★ **JobTracker 2.02, InfoSolutions, 814/355-2983, $395 to $844.** Designed specifically for publication management, this scheduling and project-management software isn't completely polished, but it manages the job competently. Dec 92

★★★ **Legal LetterWorks 1.0, Round Lake Publishing, 203/438-1048, $79.95.** Any word processor can open the 165 legal-document templates included in this collection, and the modular form design is relatively versatile. Apr 92

★★★ **Making the Grade 2.0, Jay Klein Productions, 719/591-9815, $99.95.** The Macintosh version of the Apple II program Grade Busters 1/2/3, this grade-book software with dozens of reporting options is easy to learn; but if you're already spreadsheet-literate, the friendly dialog boxes and reminders may get in the way. Dec 92

★★★★ **Nolo's Living Trust 1.0, Nolo Press, 510/549-1976, $79.95.** Gracefully guiding users through the process of drafting a living trust, this product is carefully thought out and a great value for simple trusts. Aug 92

★★★ **Nutri-Calc Plus 1.2, Camde Corp., 602/926-2632, $225.** Designed for knowledgeable and serious users, this powerful, flexible program manages nutrition information and analyzes diets. Dec 92

★★★ **Stat-Ref 3.2a, Teton Data Systems, 307/733-9258, $95.** Medical database on CD ROM lets you search by keyword. Because it provides access to limited sets of journal citations, it's not suitable for research, but it could effectively replace a small reference library in an office. Jan 93

WRITING TOOLS

★★ **Correct Grammar 3.0 (3.01), Wordstar International, 415/382-8000, $99.** Illogical and inappropriate recommendations are a hallmark of all grammar checkers, but this one also violates Mac conventions in irritating ways. Aug 92

★★★ **Correct Letters 1.1 (1.0), Wordstar International, 415/382-8000, $49.** In addition to more than 250 ready-made business letters, this HyperCard-based product boasts an excellent online Guide to Letter Writing. The disabled Find command is mystifying and inconvenient. Jul 92

★★ **Correct Writing 2.0, Wordstar International, 415/382-8000, $49.** For those who are unsure of the elements of style, this online reference is convenient and comparatively inexpensive, but it is far from complete. Sep 92

★★★ **DocuComp II 1.0 (1.03), Advanced Software, 408/733-0745, $179.95.** Document-management utility compares text in two versions of the same file and reports the differences in a comprehensive, easy-to-follow format. Nov 92

★★★★ **EndNote Plus 1.2 (1.2.1), Niles and**

Associates, 510/649-8176, $249. Reference database and tool for creating citations and bibliographies is now accessible from within Microsoft Word 5.0, representing a significant enhancement to this excellent product. Sep 92

★★★ **IdeaFisher 2.0, Fisher Idea Systems, 714/474-8111, $595.** Inspiration never comes easily, but this creativity tool with a question bank of 6000 questions and an idea bank of 61,000 words and 700,000 links might help get the juices flowing. Jan 93

★★★ **LetterPerfect for Macintosh 2.1, WordPerfect Corp., 801/225-5000, $149.** Stripped-down version of WordPerfect measures up as a serviceable low-end word processor, with clean, accurate documentation and an uncluttered interface. Jan 93

★★★★ **Microsoft Word 5.0, Microsoft, 206/882-8080, $495.** New features, including drag-and-drop editing, along with an enhanced set of familiar features, add up to a word processor that is kinder and gentler—as well as bigger and slower. Apr 92

★★ **Nisus Compact 3.3 (3.31), Nisus Software, 619/481-1477, $150.** Inexpensive price and low disk-space requirements don't compensate for this word processor's many missing features, including mail merge, macros, and word count. Memory quirks are an additional problem. Aug 92

★★★ **Plots Unlimited 1.04, Ashleywilde, 310/456-1277, $399.** Peter loves Allison but she has a breakdown when he confesses to murder. Or maybe not. This writing tool's database contains 5600 plot twists, all linked. The interface is imperfect, leaving items in bold when they should be grayed out, and it requires too much mousing. Jul 92

★★★★ **Pro-Cite 2.0, Personal Bibliographic Software, 313/996-1580, $395.** Valuable bibliographic database program generates large, complex bibliographies. Some features aren't easy to use, but it does have 20 predefined and 6 user-defined forms, plus flexible sorting options. Jun 92

★ **StoryLine 1.02 (1.4), Truby's Writers Studio, 310/575-3050, $345.** Frustrating and sometimes haphazard HyperCard-based program attempts to offer expert training in the craft of plot development. Aug 92

★★ **Taste 1.02 (1.02c), DeltaPoint, 408/648-4000, $149.** The page-view, WYSIWYG orientation of this word processor with page-layout features makes it considerably slower than text-oriented word processors. Redraw and translator bugs are other problems. May 92

★★★ **Thunder 7 1.0.5 (1.5), Baseline Publishing, 901/682-9676, $99.95.** The speed, customizing options, and overall feature-set of this stand-alone spelling checker and thesaurus are admirable, but before you can trust it implicitly, it needs a dictionary with greater integrity. Jul 92

★★★ **TypeReader 1.0, ExperVision, 408/428-9988, $695.** Speed and accuracy combine with a straightforward operating style in this high-end optical character-recognition software that doesn't do everything its competition does, but is a major contender nonetheless. Feb 93

★★★ **WordPerfect for Macintosh 2.1 (2.1.2), WordPerfect Corp., 801/225-5000, $495.** Play QuickTime movies in your text files or publish and subscribe with this upgrade. WordPerfect continues to provide the best desktop publishing and graphics capabilities of any word processor, but it lacks glossary- and table-creation features. Jun 92

★★★ **WordScan, WordScan Plus 1.0 (1.01), Calera Recognition Systems, 408/720-8300, $295, $595.** The idiosyncratic interface of these two OCR programs is only a minor inconvenience considering their relative accuracy and speed. Jun 92

★★★★ **WriteNow 3.0, T/Maker Company, 415/962-0195, $249.** The streamlined approach of this low-end word processor will appeal to many Macintosh users, especially the storage-conscious. A nice mix of features includes impressive implementation of style sheets. Sep 92

INPUT DEVICES

★★★ **A³ Mouse, Mouse Systems Corp., 510/656-1117, $134.95.** A smooth ride and tight resolution characterize this optical device with three light-touch keys. Stronger software would have made it a more attractive package; the software's incompatibilities and limitations are a problem. Jun 92

★★★ **Acecat for Macintosh, AceCAD, 408/655-1900, $149.** It's the hands-down winner in the digitizing-tablet price competition, but although this product works well, it lacks some of the amenities of higher-end tablets. Aug 92

★★★★ **The Bat, Infogrip, 504/766-8082, $495.** Right- and left-hand keypads slant the little fingers down and the thumbs up, with built-in wrist rests. Our reviewer considered it the best ergonomic device she'd seen; the downside is learning to type all over again. Oct 92

★★★ **DrawingBoard II, Drawing Pad, CalComp, 800/932-1212, $645, $395.** Two likable features of these digitizing tablets are the transparent, hinged cover for securing artwork, and a menu strip with buttons for changing drawing modes and accessing macros. Stylus problems and CalComp's haphazard tech support are drawbacks. Jul 92

★★★ **Mouse-Trak, Itac Systems, 214/494-3073, $179.** Well-positioned, easy-to-rotate trackball with a soft wrist-pad is comfortable to use, but must be disassembled to reconfigure the buttons. Nov 92

★★★ **MouseMan, Logitech, 510/795-8500, $129.** Bear-paw–shape mouse with three programmable buttons is handsome and solidly made. It may be too big for some hands. Jun 92

★★★ **TrackMan, Logitech, 510/795-8500, $149.** There's a right-hand bias to this trackball with three programmable buttons and a handy click-lock feature. Jun 92

★★★★ **Turbo Mouse 4.0, Kensington Microware, 415/572-2700, $169.95.** The large buttons on either side of this trackball provide just the right measure of tactile feedback while the removable ball glides freely. The breakthrough feature, though, is the software that lets you customize many of the trackball's functions. Nov 92

★★★ **Voice Express, MacSema, 503/757-1520, $399.** Voice-recognition board lets you record words or phrases that trigger simple key sequences, but commands are limited to those with keyboard equivalents, and the system is weighed down by several quirky features. Apr 92

★★★ **Voice Navigator II, Articulate Systems, 617/935-5656, $699.** Stand-alone SCSI device offers an impressive, full-featured set of tools for voice control of your Mac, but mastering them takes time and effort. Apr 92

★★★ **Z-Nix Cordless SuperMouse, Z-Nix, 714/629-8050, $99.** Sleek and attractive cordless mouse works reliably and is attractively priced, but suffers from the same line-of-sight limitations as other infrared devices (such as TV remote controls). Dec 92

MISCELLANEOUS HARDWARE

★★★ **ACS300 Computer Speaker System, Altec Lansing Consumer Products, 717/296-4434, $400.** Clamshell-shape high/midrange speakers come with a freestanding subwoofer and power supply. The sound is rich and smooth, but the cabling is nonstandard, and there is no on/off switch. Nov 92

★★★ **Bose RoomMate speakers, Bose Corp., 508/879-7330, $329.** Shielded stereo speakers with a rich, bassy sound can double as regular stereo speakers. Unfortunately, they're heavy, expensive, and the highs are muddy. Jun 92

★★★ **MacSpeaker MS-1, Monster Cable, 415/871-6000, $229.95.** Crystal-clear highs and a meaty midrange are the best features of these shielded stereo speakers. They're beautifully designed for close-up listening, but the bass sounds wimpy. Jun 92

★★★★ **Media Control Station, JLCooper Electronics, 310/306-4131, $269.95.** This versatile tool connects to the Mac through an ADB port and offers an easy and intuitive way to cue and edit QuickTime movies, MIDI files, multimedia playlists, and other dynamic data. Feb 93

★★★★ **The Miracle Piano Teaching System 1.0, Software Toolworks, 415/883-3000, $499.95.** Painstakingly crafted music and piano instructor comes with keyboard, software, and 120 songs, including classical, movie-theme, and rock. The program offers encouragement and advice, and ends every lesson with a synthesized orchestra accompaniment. Oct 92

★★★★ **The Mouse Yoke, Colorado Spectrum, 303/225-6929, $34.95.** Gadget turns an ordinary mechanical mouse into an aircraft-style steering wheel, or yoke, for use with flight simulators. Simple, elegantly executed concept uses quality materials; device is not appropriate for driving simulations or shooting games. Dec 92

★★★ **Organizer Link II (Model OZ-893), Sharp Corp., 800/321-8877, $129.99.** If you own a 5000-, 7000-, or 8000- series Sharp Wizard, this program and cable allow you to connect it to a Mac serial port to exchange data. It's functional, but does have some minor weaknesses. Jan 93

★★★ **PhonePro 1.0.3, Cypress Research Corp., 408/752-2700, $950.** Application makes it relatively easy to develop a multiple-choice voice-mail system using your Mac, especially for those with programming backgrounds. The product includes a 9600-bps modem and a headset/microphone. Feb 93

★★★★ **PowerKey 2.0, Sophisticated Circuits, 206/485-7979, $119.** Ingenious, well-designed automated power strip has four surge-protected outlets that are controlled by the keyboard's on/off switch. The equally clever software can turn on your Mac, unattended, run a Quic-

continues

Keys macro (QuicKeys Lite included), and shut down again. Dec 92

★★★★ **Ringo LM, Mac5ema, 503/757-1520, $189.95.** If your sole phone-line is doing double duty as a fax and voice line, this telephone-line manager is the answer to your prayers. May 92

MODEMS/NETWORK HARDWARE

★★★★ **Comstation 2, P5I Integration, 408/559-8544, $399.** Unusually well designed software accompanies this fax/data modem. The simple, straightforward interface and handy QuickFax DA are positives; uninformative error messages are minor negatives. Jun 92

★★★ **Comstation 4, P5I Integration, 408/559-8544, $499.** An otherwise solid fax/data modem for network use is hurt by an awkward process for distributing faxes, plus the need for a separate file server and fax server. Jun 92

★★ **EtherPrint, Dayna Communications, 801/531-0600, $499.** It's possible to connect a single LocalTalk printer to an Ethernet network using this device, but it's an expensive option. Dec 92

★★★ **EtherPrint Plus, Dayna Communications, 801/531-0600, $649.** Support four LocalTalk products on an Ethernet network using this device that can also serve as an inexpensive AppleTalk router. Dec 92

★★★★ **EtherWrite, Compatible Systems Corp., 303/444-9532, $695.** Elegant and cost-effective device with excellent network-management software allows up to six LocalTalk products to connect to an Ethernet network. Dec 92

★★★★ **PathFinder, Dayna Communications, 801/531-0600, $899.** For simple networks, this LocalTalk-to-Ethernet router is a great value, as well as a great time-saver for beginning network managers. It uses AppleTalk only. Jan 93

★★★ **PowerModem, P5I Integration, 408/559-8544, $299.** Superior fax software distinguishes this fax/data modem for PowerBooks, but it's not the best choice for those who do a lot of online work that requires a high-speed data modem. Jul 92

★★★★ **PowerPort/Gold, Global Village Communications, 415/329-0700, $499.** If you need 14,400-bps throughput, this data/fax modem is a champ. Its improved software and packaging raise the standards for PowerBook modems. Dec 92

★★★ **QBlazer, Telebit Corp., 408/734-4333, $599.** If portability is an important issue, this 9600-bps modem's pint size and battery power make it an attractive choice; otherwise, its high price plus the lack of Mac software and send-fax features work against it. May 92

★★★ **QuickTel Xeba 9600, Logicode Technology, 805/499-4443, $319.** Sleek, slanty, futuristic-looking fax modem offers all the features you'd expect, including acceptable fax software. Apr 92

★★★★ **Sportster 14,400 Fax/Data Modem, U.S. Robotics, 708/982-5001, $599.** Several nice features, including an easily accessible power button and a front-mounted volume-control dial, make this 100 percent Mac-ready, 14,400-bps fax/data modem better than average. Feb 93

★★★★ **SupraFaxModem V.32bis, Supra Corp., 503/967-2400, $399.95.** Send and receive faxes and data at speeds up to 14,400 bps with this attractively priced fax/data modem. The software works well; tech support is adequate. Aug 92

★★ **Ultima Home Office, Prometheus Products, 503/692-9600, $649.** When it can reliably transmit data at high speeds and the voice bugs are fixed, this fax modem with voice mail will be worth a second look. Oct 92

★★ **Viva 14.4/Fax, Computer Peripherals, 805/499-5751, $469.** In data mode, this 14,400-bps fax/data modem performed well, but the software bundled with it is barely adequate. Jan 93

★★ **WorldPort 9600 MNP5, U.S. Robotics, 708/982-5001, $475.** Only slighter larger than a deck of cards, this 9600-bps modem is geared toward PC users, with a user guide that never mentions Macs and software that is only for PC compatibles. Jan 93

PRINTERS

★★ **C. Itoh ProWriter Printer, C-Tech Electronics, 714/833-1165, $2395.** Not only is this laser printer more expensive than most personal page printers, it also offers less-impressive features and so-so output. Nov 92

★★★★ **HP LaserJet 4M, Hewlett-Packard, 800/752-0900, $2999.** An Intel i8960 RISC processor makes printing complex images faster than ever with this 600-dpi printer, while the Canon LBP-EX print engine and microfine toner guarantee smooth curves and crisp characters. An autoswitch feature makes it a flexible option for mixed-platform offices. Feb 93

★★★ **HP PaintJet XL300, Hewlett-Packard, 800/752-0900, $3495.** The output of this color inkjet printer won't satisfy demanding graphic arts professionals, but it's great for business users interested in punching up their presentations. Oct 92

★★★★ **IBM LaserPrinter 10A, IBM Corp., 800/358-5835, $3995.** Beautifully defined text, razor-sharp line art, clear gray tones—the output from this large, awkwardly designed, 600-dpi PostScript printer is dazzling, and all for under $4000. Aug 92

★★★★ **LZR 1560, Dataproducts Corp., 818/887-8000, $3395.** Tabloid-size 400-dpi laser printer blazed through our standard printer speed tests and produced output noticeably better than that of 300-dpi printers. It's a good choice for a mixed network. Sep 92

★★★★ **LZR 960, Dataproducts Corp., 818/887-8000, $2195.** This peach of a personal PostScript printer is compact, fast, and produces excellent output. Our reviewer experienced low-memory error messages, but most memory problems should be solved with the current shipping configuration of 3MB of RAM. Jul 92

★★★ **RasterOps CorrectPrint 300, RasterOps Corp., 408/562-4200, $8999.** The cost of high-quality, photo-realistic color printing takes a nosedive with this 300-dpi, dye-sublimation printer. The relatively small (8.1 by 8.6 inches on letter-size media) print area is the only significant flaw. Oct 92

★★★★ **RealTech Laser 400, Hardware That Fits, 409/760-2400, $3195.** Exactly the same tabloid-size, 400-dpi printer as the Dataproducts LZR 1560, but for slightly less money. And it produces output that is perceptibly better than that of 300-dpi printers. Sep 92

★★★★ **StyleWriter, Apple Computer, 408/996-1010, $399.** If money is tight, if you want nice-looking output, and if you have a little extra time to spare, this is a good personal printer with a new driver that makes it even better. Sep 92

★★★ **TI microLaser Turbo, Texas Instruments, 800/527-3500, $2349.** An enhanced version of TI's microLaser Plus, this PostScript Level 2 printer is an admirable performer and a dependable machine, but it leaves you wondering whether the extra $500 is worth it. Jul 92

★★★ **WideWriter, GCC Technologies, 617/890-0880, $1699.** Large-format output comes in a reasonably priced package with this ink-jet printer that can automatically feed sheets as large as 14 by 91 inches or manually feed sheets 17 inches wide with an unlimited length. Feb 93

SCANNERS

★★★★ **HP ScanJet IIP, Hewlett-Packard, 800/752-0900, $1095.** An elegant piece of technology, this desktop gray-scale scanner produces excellent results for a street price of around $750. Muddled online help and a flimsy hinge are minor problems. Aug 92

★★★★ **LightningScan Pro 256, Thunderware, 510/254-6581, $649.** A well-executed hand-held gray-scale scanner worth the cost. It creates 8-bit scans at up to 400 dpi; images scanned in two passes can be joined flawlessly. The only drawback is slow scrolling in software. Jun 92

★★★★ **Mirror 600 Color Scanner, Mirror Technologies, 612/633-4450, $1199.** Three-pass scanner with 600-dpi vertical and 300-dpi horizontal resolution is fast, precise, and an excellent value. The only liability is its somewhat quirky software. Apr 92

★★★★ **Nikon LS-3510AF Film Scanner, Nikon, 516/547-4355, 8-bit $9535, 24-bit $11,316.** The bread-box–style design of this 35mm film scanner may be reminiscent of past models, but many changes make it faster and more convenient. Still, advanced users won't be satisfied with the tools for overriding automatic exposure and tone adjustments. Sep 92

★★ **PageBrush Professional, Mitsubishi International, 415/544-2781, $795.** A brilliant idea with unfortunate rough spots. Gray-scale, hand-held scanner/mouse scans full-page or larger images and produces 300-dpi gray-scale files, but the process and software are agonizingly slow; the buttons are hypersensitive; and the product is expensive. Jun 92

★★★ **RasterOps Expresso Personal Slide Scanner, RasterOps Corp., 408/562-4200, $849.** Essentially a video camera mounted above an illuminated stage, this slide scanner outputs NTSC video. It's fast, convenient, and economical, but falls short for digital images; its best file looks worse than output from a 24-bit flatbed or slide scanner. Apr 92

SYSTEMS/STORAGE

★★★ **Duo Dock, Apple Computer, 408/996-1010, $1079.** Immensely clever desktop Mac–size housing for the Duo laptops provides back-panel connectors, a SuperDrive, electrical and physical support for external monitors, and two expansion slots. Although the Duo Dock is easy to like, some details, such as the difficulty of install-

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120mb	19ms	3.5"HH	$289	$349
170mb	13ms	3.5"HH	$319	$379
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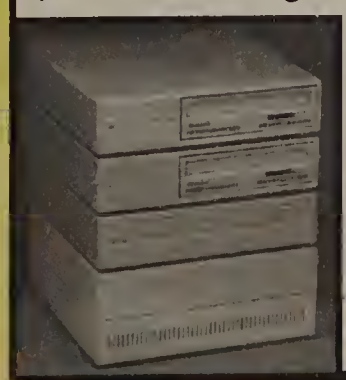

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MACWORLD

Star Ratings

ing NuBus boards, don't show Apple's usual attention to detail. Mar 93

★★★★ **Floptika 20/M, Procom Technology, 714/852-1000, $585.** It is easy to recommend this floptical drive due to its speed, relatively low cost, bundled software, and lack of problems. Although it allows invalid SCSI ID addresses, it's a fine product. Sep 92

★★★ **Freedom 120, Maxen, 619/944-0818, $699.** Battery-powered hard drive provides three to four hours of hard drive storage without a power cable; it performs at a respectable speed, but lacks a battery-power gauge and automatic sleep mode. The skimpy manual is the most serious problem. Sep 92

★★★ **Infinity Floptical 21MB, Peripheral Land, 510/657-2211, $599.** The good points of this floptical drive include extensive documentation, switchable termination, and an autoeject function, but the bad points are the odd size, the incompatibility of the bundled software with System 7, and inappropriate formatting of 800K disks. Sep 92

★★ **Performance/040 (33MHz), Impulse Technology, 404/889-8294, $2399.** For disk-intensive tasks, this 68040 33MHz accelerator board tested slower than the native CPU and, in general, was slower than comparable accelerator boards. It is compatible with all Mac II's. Oct 92

★★★ **PLI MiniArray 850MB, PLI MiniArray 2GB, Peripheral Land, 510/657-2211, $6999.** These RAID storage systems contain multiple drives that work as a single unit; they're an excellent option for image processing or tasks that involve importing and exporting large files, but the price per megabyte is high. Jan 93

★★★ **PowerBook 145, Apple Computer, 408/996-1010, $2149 to $2499.** Adequate but essentially outdated notebook computer is an upgraded version of the discontinued PowerBook 140 with a faster 25MHz 68030 CPU, but RAM expansion is limited, and it doesn't have a built-in video port. Feb 93

★★★★ **PowerBook 160, Apple Computer, 408/996-1010, $2429 to $3149.** A built-in video port and gray-scale capability are the new features Apple offers with this notebook computer. While it offers good processing speed and power, the passive matrix display doesn't cut it for all-day use as a primary screen. Feb 93

★★★★ **PowerBook 180, Apple Computer, 408/996-1010, $4109 to $4469.** An active matrix screen and a math coprocessor are the only differences between this notebook computer and the PowerBook 160, but the beautiful display is worth the extra $1000. Feb 93

★★★★ **PowerBook Duo 210 and 230, Apple Computer, 408/996-1010, 210 (4/80) $2249, 230 (4/80) $2609.** Apple's smallest computers have the pleasing heft, size, and shape of hardbound books but pack the horsepower of 030 chips. Although the screen, the keyboard, and the trackball (more of a trackmarble) feel small, these computers virtually cry out to be picked up, handled, and used. Mar 93

★★★ **QuadFlextra, Quadram, 404/923-6666, $495.** Remarkable super-high-density floppy drive uses an ingenious disk-formatting method to put just over 20MB on a single 3½-inch floppy disk, but it may not be as cost-efficient as other options. Apr 92

★★★★ **Quantum Passport XL 240, Quantum Corp., 800/624-5545, external chassis $469, 240MB drive $979.** An excellent piece of engineering, this fast, trouble-free, removable hard drive is designed to solve the problem of how to transport data from one computer to another. The price is only somewhat discouraging. Oct 92

★★★★ **Radius Rocket 33, Radius, 408/434-1010, $2499.** The accelerator board of choice for our reviewer, this 68040, 33MHz board is fast, reasonably priced, and compatible with a Mac II (with Rev. B ROM), IIx, IIcx, or IIci. Oct 92

★★★ **TokaMac II FX 33, Fusion Data Systems, 512/338-5326, $2995.** CPU and FPU tasks on a Mac IIfx are faster than on a Quadra 950 with this 68040 33MHz accelerator board, but video- and disk-intensive tasks are still slower. It may be worth the cost if your IIfx already has a fast video board and more than enough memory. Oct 92

VIDEO/DISPLAY

★★★ **BookView Imperial, Computer Care, 612/371-0061, $1399 (includes 6MB of RAM).** This notebook-display adapter supports all common sizes of monitors, including 16-inch and 19-inch, plus both Mac and VGA. It is expensive, however, and uses 2MB of system memory for video processing. Feb 93

★★★ **Canon RC250, Canon USA, 714/753-4320, $799.** An adequate choice for users looking for an inexpensive still-video system. Camera captures up to 50 color images per video floppy disk and hooks up to any television. Jun 92

★★ **ClearVue/SD 21, RasterOps Corp., 408/562-4200, $1799.** If this 21-inch monochrome display that plugs into the SCSI port supported gray scale, mirroring, and high resolutions, it would be a valuable tool for presentations. As the product is, however, it's too functionally limited to justify the investment. Feb 93

★★ **Dycam Model 1, Dycam, 818/998-8008, $895.** Compact, point-and-shoot, still-video camera records and downloads images in 8-bit gray-scale—as long as the battery doesn't die first. Jun 92

★★★★ **Macintosh 16" Color Display, Apple Computer, 408/996-1010, $1599.** The display quality of Apple's 16-inch monitor is tough to beat. It has realistic color, minimal curvature, and a uniform display. Jun 92

★★★ **Power Portrait, Sigma Designs, 510/770-0100, $899 or $949.** Hook your Classic or PowerBook to this 15-inch portrait-style monochrome display. Built-in QuickDraw acceleration speeds up the slow SCSI connection on the one hand and results in a few software incompatibilities on the other. Feb 93

★★★★ **PowerVision, Mirror Technologies, 612/633-4450, with no RAM $499, with 2MB of RAM $699, with 4MB of RAM $999.** Separate VRAM means you don't lose system memory with this nicely priced notebook display adapter. It only supports 12-inch and 14-inch monitors, and 15-inch portrait gray-scale and black-and-white monitors. Feb 93

★★★★ **VideoSpigot, SuperMac Technology, 408/245-2202, $499 to $1599.** Grab video from a camcorder, video deck, TV, or monitor with this easy-to-install board and save it as a 24-bit QuickTime movie. Comes with ScreenPlay, an application that lets you choose from among several compression options, frame rates, and window sizes. May 92 m

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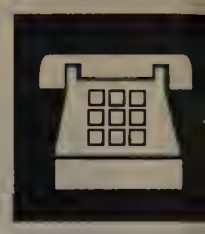

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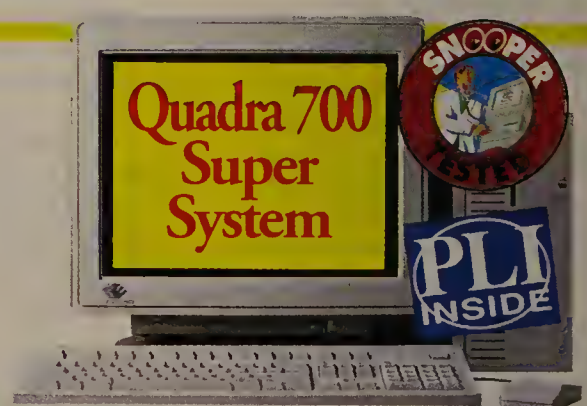

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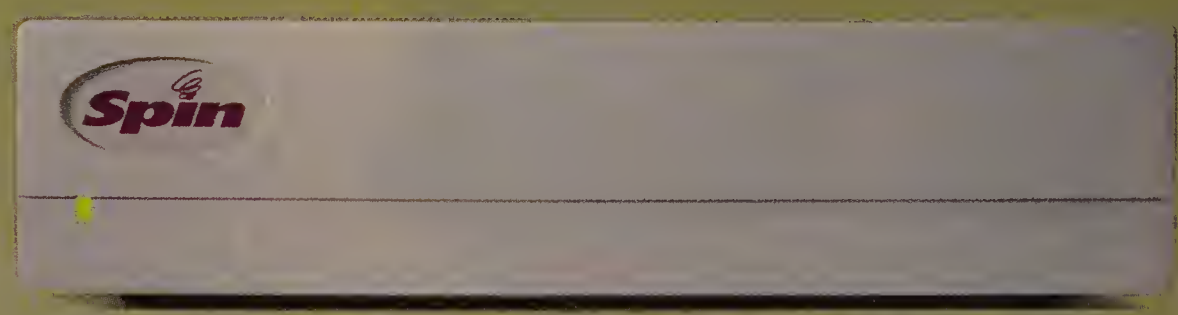

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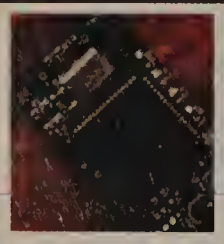

PSI POWERMODEM IV $329
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Completely Internal PowerBook Modem

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Mac Systems

ABC MAC SUPER SYSTEM SPECIALS

All Advertised System Specials are bundled with Symantec GreatWorks Integrated Package, Norton Utilities, Maxo Snooper Diagnostics Program, and CasaBlanca Works Drive 7

APPLE MAC QUADRA 700 SUPER SYSTEM
Quadra 700 w/8MB RAM, Quantum 120 MB HD, SuperMac 17•T Trinitron Color Monitor & 24-Bit Color VRAM, NewGen 400P (400 DPI) Laser Printer, Ext. Keyboard, UMAX UC630 Color Scanner, Mass Microsystems 44MB Syquest Drive, Quark XPress OR Aldus PageMaker Software, and GreatWorks, Norton Utilities, Maxo Snooper & Drive 7 Software!

$245 mo.*

APPLE NEW! POWERBOOK 180 SYSTEM

- PowerBook 180 (32MHz, Math Co-Processor, 8MB RAM, 80MB Hard Drive)
- 16 Gray Scale ACTIVE MATRIX Screen
- Bundled w/Symantec GreatWorks, Norton Utilities, Drive 7 & Maxo Snooper Software

$4449/$166 mo. *

MAC CPU SPECIALS

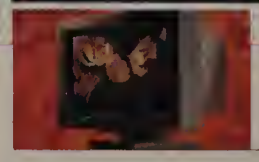
APPLE Mac Classic II 4/40	$1029/$39 mo.*
APPLE Mac LC II 4/40	$1195/$44 mo.*
APPLE NEW! Mac IIvx 5/213 w/CD ROM	$3275/$121 mo.*
APPLE Mac PowerBook 145 4/80	$2295/$85 mo.*
APPLE NEW! Mac PowerBook 160 4/80	$2599/$96 mo.*
APPLE NEW! Mac PowerBook DUO 210 4/80	$2199/$81 mo.*
APPLE NEW! Mac PowerBook DUO 230 4/80	$2599/$96 mo.*
APPLE Mac Quadra 700 4/210	$3899/$144 mo.*
APPLE Mac Quadra 950 8/510	$6550/$235 mo.*

NEWGEN PS 400P
400 DPI Laser Printer
$1650/$61 mo.*

NEWGEN PS 880
800 DPI Laser Printer
$2695/$99 mo.*

E-MACHINES T19 II BUNDLE
New Multi-Res Trinitron 19" Color Monitor with Futura MX 24-Bit Accel. Card

$3150 or $117*



SUPERMAC 17•T BUNDLE
SuperMac Multi-Res Trinitron Monitor with 24-Bit Accel. Card

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Snooper 2.0 & Virex w/NUBus diagnostics Card

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UMAX UC840 800 DPI COLOR SCANNER ..... $1295/48 mo.*

- *One Lamp, Auto-Calibration, Awesome Speed*
- *800 x 400 DPI, AND UP TO 1600 x 1600 DPI with Software Interpolation*
- *Includes full Adobe PhotoShop*

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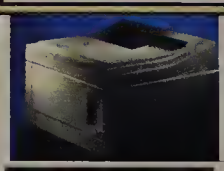
UC630 w/WordScan OCR Software $1279

PLEASE CALL ABOUT UMAX TRANSPARENCY OPTIONS!



NEW!! HP LASERJET 4M 600DPI LASER PRINTER
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NEW!! HP COLOR DESKWRITER 550C
$749

HP DESKWRITER $399

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200 MB–$449
Maxtor 7213

External Maxtor 7213 $519

Been looking for 200MB to fit in your Mac or out, but the price has been too much? Wait no more. The Maxtor 7213 is the drive for you. Quiet, fast and low- power, the Maxtor 7213 fits in almost every Mac that can accommodate a 3.5" drive. With a seek time of 16ms and transfer rates as high as 1.3MB per second, you can't find a faster 200 MB drive at a lower price. Don't wait, order today!

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MB	INTL	EXTL
240	$589	$659
525	1149	1219
1225	1899	1969
ELS Drives		
42	$199	$279
85	259	329
127	329	399
170	369	429
Go•Drives		
80	$349	$499†
120	469	599†

†Battery-Powered portable case for PowerBooks

Ask about our new micro-Tower premium enclosure

Fujitsu

MB	INTL	EXTL
520	$1049	$1149
1.2G	1599	1699
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Includes Fujitsu's 5-Year Warranty

Toshiba

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Ask about APS software specials

Micropolis

MB	INTL	EXTL
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2.0G	2899	2999

Includes Micropolis' 5-Year Warranty

Maxtor

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213	449	519
340	699	769
535	999	1079
1.2G**	1649	1749
1.7G**	1899	1999

**Includes new 5-Year Warranty

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The New Standard

Internal SyQuest 5110c $639

You know the SyQuest 44 and 88. Together they are the transportable storage standard in the Macintosh market. True interchangeability has been the only problem in an otherwise idyllic transportable storage world. Now SyQuest's 5110c solves the problem. With both read and write compatibility with 44MB and 88MB cartridges*, you no longer have to wonder which SyQuest unit to buy.

SyQuest

Model	EXTL
SQ555	$399
SQ5110	499
SQ5110c*	699
Dual 44	799
Dual 88	959

*Read/writes 44 and 88MB cartridges but does not format 44MB cartridges

DAT

Model	INTL*	EXTL
APSDAT	$1499	$1599
2.6–5 GB Compression DAT		
APSDAT	1199	1299

Desktop & Portable Units
Archive-based Mechanisms
*Quadra 900 and 950

Digital Audio Tapes
Maxell 60-Meter.....$12
Maxell 90-Meter.....16

Epson

Model	INTL	EXTL
MO	$1099	$1199

Magneto Optical Drive

SOLA

UPS	
450 watt	$220
600 watt	330

TEAC

155MB Tape Back-up	$499
600MB Tape Back-up	799

All tapes drives include Retrospect by Dantz Development

Toshiba

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Includes five-disc APS CD Library

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• **Prices and specifications subject to change without notice.**

•**All hard drives include brackets, cables, cords and LEDs required for operation** with the specified Macintosh. All hard drives come preformatted with Apple's latest stable all-platform System software, at least 9.2 MB of compacted publicly-distributable software, and APS Technologies' ALLIANCE POWER TOOLS SCSI formatter/hard disk partitioner
• **Toll-free technical support as often or for as long as you need.** Regular hours are 8 am to 8 pm Monday thru Friday, 10 am to 4 pm Saturday, Central Time

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Complete Packages:
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Includes 20" Monitor, 8-Bit Viden Board, & Cable Complete!

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Monitor Only $599

Special Value! An affordable high quality, 20 inch grayscale monitor package - complete - for less than $800! The Sampo 20" OfficePro IIa grayscale is featured by many "major brands" for hundreds more! Why pay extra? If you are not satisfied we will give you your money back!

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14" Color Monitor - 256 Color Package	499
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20" Grayscale - 256 Package - NuBus	799
20" Grayscale - 256 Pkg.- LC, LCII, SE/30	999
20" Grayscale Monitor Only - Ikegami	799
20" Grayscale - 256 Package - NuBus	999
20" Grayscale - 256 Pkg.- LC, LCII, SE/30	1,199
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20" Trinitron - 256 Color Package	1,999
20" Trinitron - 16 Million Color Pkg.	2,649

All Packages Include Monitor, Video Board & Cable!

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PaintBoard 24	1,529
PaintBoard Li	829
24STV	789
8XL	479
ClearVue/Classic	229
ClearVue/SE	329
ImagePak Still Compression	319

Call for up-to-date prices and information on product additions!

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SyQuest 44 Meg. Cartridge - Each	68
SyQuest 44 Meg. Cartridge - 10-Pack	619
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SyQuest 88 Meg. Cartridge - 10-Pack	959

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Complete System - includes cables, carrier, and software.
All drives are pretested and are warranted for 24-months. The Relax Mobile is a complete package - all cables and software are included - at no additional charge!

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While Supplies Last - Limited Quantity! Lowest cost per megabyte - 67 ms. average access.	
600 Meg. Optimem ISO Model 750	1,799
Premium Quality at Low Cost - 60 ms. average access.	
600 Meg. Ricoh ISO 5030E-II	2,199
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Macintosh & IBM compatible **$1,149**

***Each 3-1/2" erasable optical cartridge holds over 120 megabytes of data!** The **Sierra MO** (shown) is an ideal primary or backup storage device for IBM or Macintosh personal computers. Complete package - includes SCSI cable, Mac software, and external power supply. Specify 110 or 220 VAC.*

Includes media, software & cables!

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128 Meg. Epson ISO	1,149
128 Meg. Cartridge - Each	39
128 Meg. Cartridge - 10 Pack	349

Hard Disk Drives

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108 Meg. - ST1133N, 15 ms.	299	359
240 Meg. - ST3283N, 12 ms.	569	629
510 Meg. - ST1581N, 14 ms.	1,139	1,199
5-1/4" Full Height - WREN		
300 Meg. - ST4350N, 16.5 ms.	939	999
600 Meg. - ST4702N, 16.5 ms.	1,339	1,399
1.0 Gig. - ST41200N, 15 ms.	1,639	1,699
1.4 Gig. - ST41651N, 15 ms.	1,999	2,059
1.9 Gig. - ST42100N, 12.9 ms.	2,539	2,599
5-1/4" Full Height - WREN Runner		
330 Meg. - RUNNER, 10.7 ms.	1,039	1,099
660 Meg. - RUNNER, 11.9 ms.	1,439	1,499
5-1/4" Full Height - ELITE Ultra-High Performance		
1.4 Gig. - ELITE-I, 11.5 ms.	2,139	2,199
2.1 Gig. - ELITE-II, 11 ms.	2,939	2,999
3.5 Gig. - ELITE-III, 11 ms.	3,939	3,999
Fujitsu 3-1/2" Half Height		
425 Meg. - 2623SA, 9 ms.	1,039	1,099
520 Meg. - 2624SA, 9 ms.	1,139	1,199
5-1/4" Full Height		
960 Meg. - 2266SA, 11.5 ms	1,639	1,699
1.7 Gig. - 2652SA, 11.5 ms	2,639	2,699
Toshiba 3-1/2" Half Height		
880 Meg. - MK438F8, 9 ms.	1,239	1,299
1.2 Gig. - 2624SA, 9 ms.	1,839	1,899

	Internal	External
Conner 3-1/2" Half Height		
42 Meg. - CP3040, 25 ms.	239	299
85 Meg. - CP-30080E, 17 ms.	299	359
120 Meg. - CP-30100, 19 ms.	359	419
Quantum 3-1/2" ELS		
42 Meg. - ELS42, 19 ms.	189	249
85 Meg. - ELS85, 17 ms.	269	329
127 Meg. - ELS127, 17 ms.	329	389
2-1/2" - "Go•Drive" Series - for PowerBook only		
80 Meg. - Go•Drive 80, 16 ms.	339	399
120 Meg. - Go•Drive 120, 16 ms.	499	559
3-1/2" PDS Series		
1.2 Gig. - PD1225S, 11 ms.	1,839	1,899
Maxtor 3-1/2" Low Profile/Low Power		
120 Meg. - 7120S, 17 ms.	339	399
5-1/4" Full Height		
645 Meg. - XT8760, 16.5 ms.	1,399	1,459
1.0 Gig. - Panther, 13 ms.	1,499	1,559
1.5 Gig. - Panther, 13 ms.	1,799	1,859
Hewlett Packard 3-1/2" Half Height		
400 Meg. - HP2235, 12.6 ms.	939	999
1.0 Gig. - HP2247, 12.6 ms.	2,039	2,099
5-1/4" Full Height		
1.0 Gig. - HP97558, 13.5 ms.	1,939	1,999
1.3 Gig. - HP97560, 13.5 ms.	2,399	2,459

Modems

Xeba FAX/Modem 2400/9600 129
v.42bis 9600 bps EAX and 2400 bps modem. Includes QuickLink II Mac software & cable. Hayes compatible, self diagnostics.

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All Supra Products have a 5-year Warranty

Supra Modem 2,400 89
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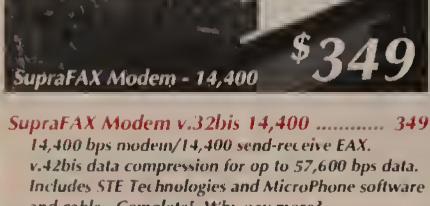
Supra Modem 2,400 - MacPac 119
v.22his 2,400 bps modem (9,600 with data compression). Complete package includes Macintosh software and cable.

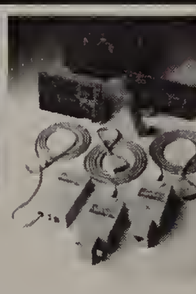
SupraFAX Modem Plus 2,400 199
2,400 bps modem/9,600 send-receive FAX. v.42bis data compression for up to 9,600 bps data in a low-cost package. Includes STE Technologies and MicroPhone software and cable.

SupraFAX Modem v.32 9,600 299
9,600 bps modem/9,600 send-receive FAX. v.42bis data compression for up to 38,400 bps data. Includes STE Technologies and MicroPhone software and cable. Performance and low-cost!



SupraFAX Modem v.32bis 14,400 349
14,400 bps modem/14,400 send-receive EAX. v.42bis data compression for op to 57,600 bps data. Includes STE Technologies and MicroPhone software and cable. Complete! Why pay more?

Ethernet



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Asanté MacCon3 - 64K 199
The 3-in-1 (Thick, Thin and 10BaseT) Ethernet card for most expandable Macintoshes inclodіng the IIsi and SE/30. Not available for the LC or LCII.

Asanté MacCon+ - 64K 159
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Asanté FriendlyNet Adapters 79
Designed to work with the new Apple Ethernet cabling system - a plog-and-play networking system which makes Ethernet connectivity as simple and easy as LocalTalk.

Asanté 10BaseT Hub/8 239
An economical way to expand yoor Ethernet network osing onshielded twisted pair wiring (10BaseT). Sopports IEEE specifications.

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AddressWriter envelope and label printer

AddressWriter Printer 479
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Label Feeder Adapter	75
AppleTalk Network Adapter	189
AppleTalk 5-User Site License	139

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AppleTalk Network Adapter	189
AppleTalk 5-User Site License	139

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250 Meg. Tape Vista - Archive	699
600 Meg. Tape Vista - TEAC	779
"Editor's Choice Award" - MacWorld Dec. '92	
2.0 Gig. DAT Sierra - R-8yte	1,199
2.0 Gig. DAT Sierra - Archive	1,299
2.0 Gig. DAT Sierra - Hewlett Packard	1,399
2.2 Gig. Tape Vista - Exa8yte	1,949
5.0 Gig. Tape Vista - Exa8yte	3,199
8.0 Gig. DAT Sierra - R-8yte (New!)	1,399
8.0 Gig. DAT Sierra - Archive	1,499
8.0 Gig. DAT Sierra - Hewlett Packard	1,599

8.0 Gig. DAT Tape

Transportable backup solution for the Mac. Backup software and tape included!

$1,599 HEWLETT PACKARD

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Texas Instruments

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Fast 1200 dpi. Its 24-bit color for the price of grayscale!

Displays & Cards

SIGMA DESIGNS

Sigma ColorMax 15 for Power Books and LC, LC II, IIsi, IIci, IIvx, & Quadras

PowerPortrait display	639
21" SilverView Pro (mono/GS)	1099

Apple 12"/14"	399/569
Sony 1304/1604	Call/1049
Magnavox 14"	Call
E-Machines T16 II/T19 II	1295/2395
E-Machines Color Video Cards	Call

SII Seiko Instruments

Seiko 2070*LR* 20" Trinitron Multi-frequency, Trinitron display, meets MPRII

Seiko 1445 14" Trinitron	469
Smart Label Printer Plus	139

radius

Radius MonoPivot	719
New Radius PrecisionColor 20S	2350
Radius 24Xp/24Xk/Xj	495/795/Call
Radius VideoVision	1899

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For Mac Plus, Classic, SE, SE/30, LC, LC II, IIsi, II-family & Quadras

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8/16-bit for SE/30, II's & Quads	499
24-bit for SE/30, II's & Quads	599
LC-TV lets LCs work w/any TV	349

Let us help you pick the right card!

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QMS 410/860	1495/4195
Apple LaserWriter IIF/IIG	2395/3195
JetFill HP /HP high capacity	15/29
JetFill Apple-Canon/ HP Deskjet	15/64

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PLI Removable 44/88	549/679
PLI Optical 3.5"/5.25"	1395/2895
PLI Floptica/Quick SCSI	399/329

Snooper

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Snooper 1.0 NuBus Kit with Norton	139

Snooper 2.0 Includes FREE Virex

Snooper 2.0 Software with Virex	119
Snooper 2.0 NuBus Kit with Virex	149

Modems

Logicode Xeba 2400 data modem	69
Licode Xeba 9624 fax/receive	129
Logicode Xeba 9696 fax w/V.42bis	269
Xeba 14400 fax/receive w/ V.42bis	299

Supra V.32 bis Fax/Receive Modem

14,400 Data, 14,400 Send/Receive Fax (up to 57,600 bps with V.32bis data compression.

SupraFAX Modem Plus	159
SupraFAX Modem V.32	319

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Umax 840/1200S	Call/2995
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When your Mac's on, but you're not, your screen might be left with an echo of that page burned in permanently. For Trekkers enjoy over 15 displays of Tribbles, Captain Kirk, Spock, and more. **Star Trek The Screen Saver** is a stand alone product and fully compatible with After Dark. **After Dark** prevents burn-in with over 30 displays including Flying Toasters and Fish!

Berkeley Systems
5341 Star Trek the Screen Saver ..... $35.
1232 After Dark ..... $29.

Best Special Effects Product Finalist – VideoFusion

VideoFusion is a complete software solution for QuickTime post-production. Create compelling movies using unlimited layering and alpha channel support to combine video, text, and graphics. Extensive libraries of transitions, DVE moves, warps, and morphs give your movies a professional look. Non-linear editing completes this powerful special effects application.

VideoFusion
5165 VideoFusion ..... $448.

Best Compression Product Finalist – TimesTwo

TimesTwo actually makes your hard disk bigger rather than making your files smaller! A one-time installation converts your hard disk to twice its original size in minutes, leaving your data unchanged. It's completely compatible with all Mac software and works with all SCSI and erasable optical disks.

Golden Triangle
5233 TimesTwo ..... $99.

SupraFAXModem 144PB

The **SupraFAXModem 144PB** gives you 14,400 bps fax and data communications on a card that fits inside your PowerBook. You can even send and receive faxes when your PowerBook is turned off. Wake Up mode turns your PowerBook on when the modem receives a call and, when combined with the included fax software, can send scheduled faxes when rates are lowest.

Supra ○
5575 SupraFAXModem 144PB ..... $298.

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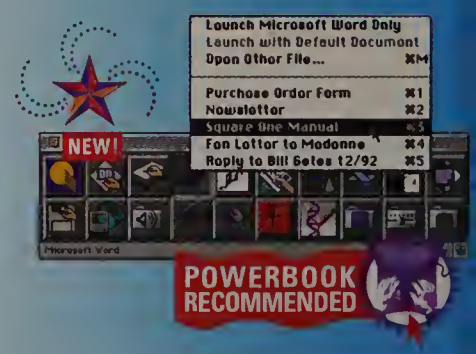
Meca Software ○
5065 Managing Your Money 5.0 ..... $32.
5677 TaxCut '92 Headstart ..... $33.



Square One

Square One stores all of your favorite files in an easy to use icon palette. To access a file, just double click on its icon. To switch between running applications, just click the Active Applications palette once. No more time wasted rummaging through your hard drive, and no goofy hierarchical menus. Just point and click with Square One.

Binary Software
5180 Square One ..... $49.

Act! For The Mac/Competitive Trade-Up

This unique, integrated contact and calendar management solution handles your hectic schedule. **Act!** schedules calls, meetings, and to-do's; generates a variety of written correspondence; and automatically remembers every detail about each contact and activity. If you're using another planning or contact program, you can switch to Act! for only $89! Call Mac's Place for details about the **Competitive Trade-up** offer.

Contact Software ○
4970 Act! For The Mac ..... $258.
5592 Act! Competitive Trade-up ..... $89.

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Create original art or apply fantastic effects to other artwork, including scanned images with new **Painter 2.0.** New features include color separation, spatter air-brush, Cubist effect, and multiple light sources. Used with the **ArtZ** 6" x 8" tablet, the effects are astonishing. The latest from the premiere tablet maker, ArtZ's stylus is cordless, batteryless, and detects 120 levels of pressure.

Fractal Design Corporation/Wacom Technology Corp. ○
5657/5355 Painter 2.0/ArtZ Tablet bundle ..... $538.

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Aladdin Systems ○

4971 StuffIt Deluxe 3.0 ..... $68.

Best Special Effects Program Finalist – Typestry

This exciting new software creates dimensional text from PostScript Type 1 and TrueType fonts. Typestry uses RenderMan to transform simple words into extraordinary pictures. It accurately simulates metals, woods, other types of surfaces which can be used to decorate text. You can also move, rotate, scale, and extrude words.

Pixar ○

5123 Typestry ..... $184.

Best Page-Design Program Finalist – Personal Press 2.0

This is the only page-layout software that intelligently assembles your text and graphics automatically so you look like an expert. It includes full-featured word processing, "Intelligent" templates, Copy Fitting, AutoFlow, text wrap, free rotation, and drawing tools. System 7 savvy.

Aldus ○

4324 Personal Press 2.0 ..... $98.

Best Children's Program Finalist – Millie's Math House

The Wall Street Journal calls it "A wonderful new preschool math program..." **Millie's Math House** was designed by early childhood experts and gives children ages 2 to 6 the building blocks for a solid foundation in math. Six engaging activities packed with essential learning concepts are included. Sound effects and colorful characters inspire kids to explore and learn!

Edmark ○

5183 Millie's Math House ..... $31.

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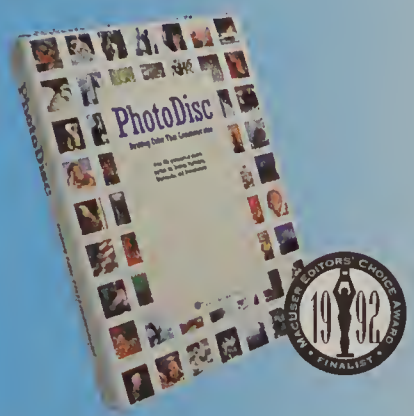

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Vol. I-VI ..... $288 each.

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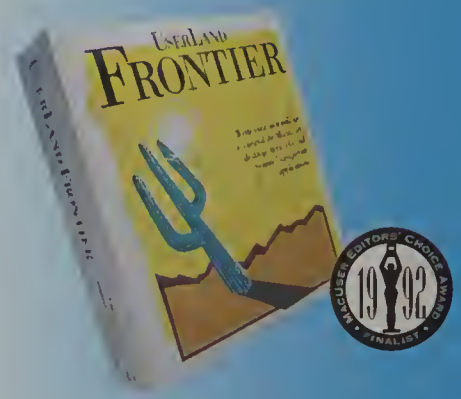
5661 ..... $104.



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4211 ..... $184.

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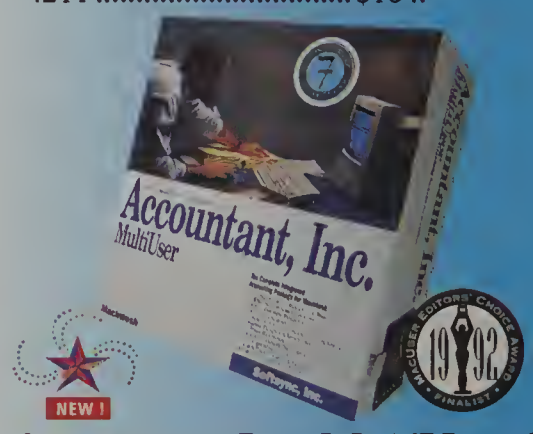

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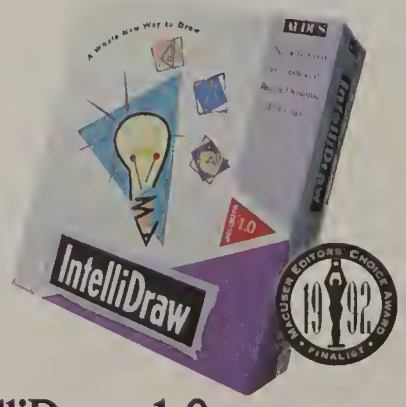

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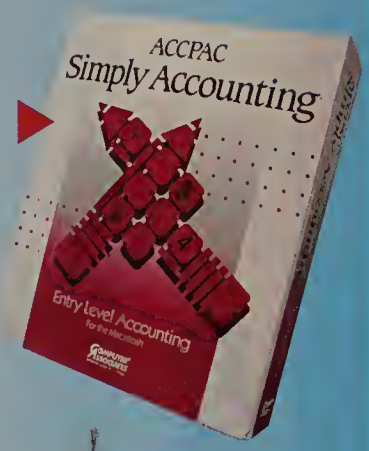

Simply Accounting contains everything you need to get up and running in a flash. The primer walks you through basic accounting principles, and includes a real-life tutorial with sample data. Yet it has all the practical, powerful features you need to grow a successful business. Reports, General Ledger, Accounts Receivable/Payable, payroll, and much more.

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1366 Simply Accounting.....$132.

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Microtek
5238 ScanMaker II .....$928.
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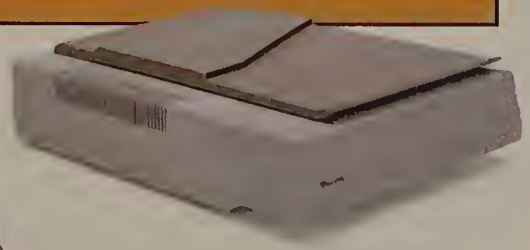

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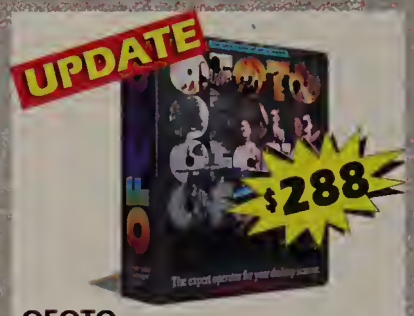

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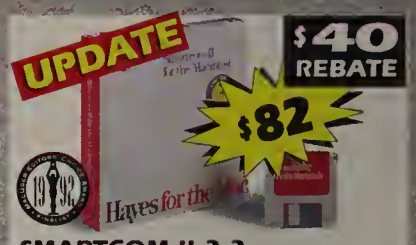

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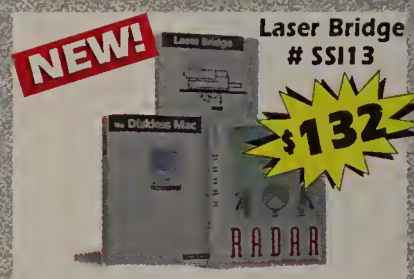

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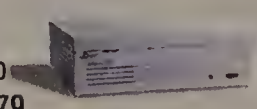

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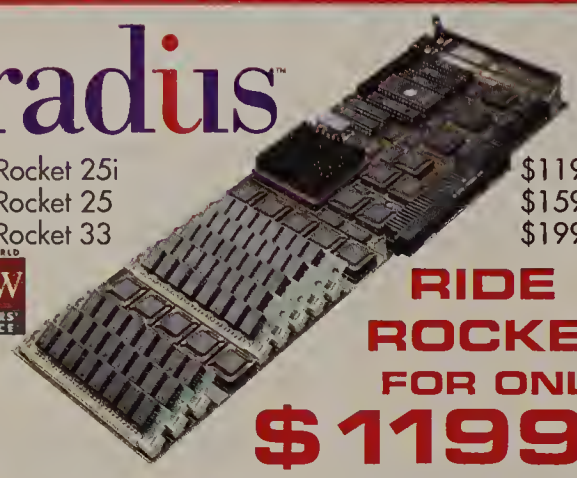

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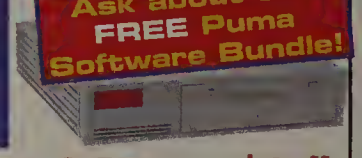

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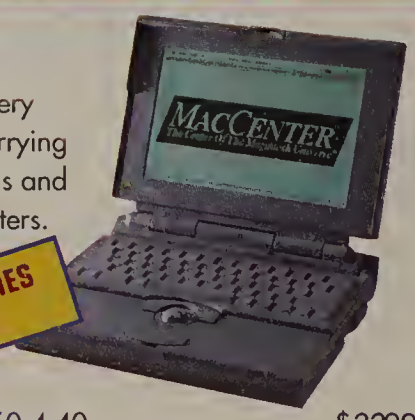
We Stock PowerBook Batteries, Battery Chargers, Carrying Case, Modems and Display Adapters.



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- 55705 TwoPage Display/19 ..... $879
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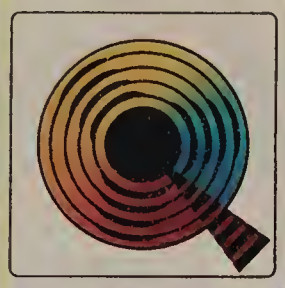

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SyQuest Drives include a TWO Year Warranty, one cartridge & necessary cables, SCSI Director™ Formatting Utility • SyQuest Cartridges carry a ONE Year Warranty.

Quantum

Unformatted Capacity	Model	Average Access	Actual MAC Capacity	Internal	External
Go Drives 2.5" Low Profile for Notebooks					
80mb	GO•80	17ms	80mb	$325	$425
120mb	GO•120	17ms	120mb	$455	$555
ELS Drives 3.5" Low Profile & Low Power					
42mb	ELS42	19ms	40mb	$185	$245
85mb	ELS85	17ms	82mb	$239	$299
127mb	ELS127	17ms	124mb	$309	$369
170mb	ELS170	17ms	160mb	$345	$405
LPS Drives 3.5" Low Profile & High Performance					
240mb	LPS240	10ms	234mb	$519	$579
525mb	LPS525	10ms	525mb	$1049	$1109
PRO Drives 3.5" High Capacity & Performance					
425mb	PRO425	19ms	406mb	$899	$959
700mb	PRO700	10ms	700mb	$1249	$1309
1.0GIG	PRO1050	10ms	1.0GIG	$1529	$1589
1.2GIG	PRO1225	10ms	1.2GIG	$1699	$1759

ELS, LPS, PRO drives carry a TWO Year Warranty. Go•Drives carry a ONE Year Warranty.

Maxtor

Price Point and Performance

Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
XT Series (3.5" Low Profile)						
120mb	7120XT	3.5" Low Profile	15ms	121mb	$299	$359
207mb	7213	3.5" Low Profile	15ms	202mb	$439	$499
LXT Series (3.5" Half Height)						
330mb	LXT-340	3.5" Half Height	15ms	324mb	$639	$699
535mb	LXT-535	3.5" Low Profile	12ms	510mb	$989	$1049
XT-8000 and Panther Series (5.2" Full Height)						
645mb	XT-8760S	5.25" Full Height	16.5ms	639mb	$1179	$1279
1.2GIG	PO-12S	5.25" Full Height	13ms	997mb	$1485	$1585
1.7GIG	PO-17S	5.25" Full Height	13ms	1433mb	$1749	$1849

Maxtor 3.5" Drives carry a ONE Year Warranty. Maxtor 5.25" Drives carry a TWO Year Warranty.

FIVE YEAR WARRANTY

FUJITSU

Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
425mb	M2623SA	3.5" Half Height	9ms	405mb	$965	$1025
520mb	M2624SA	3.5" Half Height	9ms	496mb	$1025	$1085
1.2GIG	M2266	5.25" Full Height	14.5ms	1029mb	$1579	$1679
2.0GIG	M2652	5.25" Full Height	14.5ms	1.6GIG	$2679	$2779

Seagate

Elite Series

Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
1.6GIG	ST41651N	5.25" Full Ht Wren-8	15ms	1350mb	$1909	$2009
2.1GIG	ST42100N	5.25" Full Ht Wren-9	12.9ms	1900mb	$2129	$2229
1.6GIG	ST41600N	5.25" Full Ht Elite-1	11.5ms	1307mb	$2069	$2169
2.4GIG	ST42400N	5.25" Full Ht Elite-2	11ms	2050mb	$2949	$3049
3.4GIG	ST43400N	5.25" Full Ht Elite-3	11ms	2750mb	$4129	$4229

Seagate Drives carry a ONE Year Warranty.

NEW

CONNER

Unformatted Capacity	Model	Description	Average Access	Actual MAC Capacity	Internal	External
85mb	CP30080E	3.5" Low Profile	17ms	82 mb	$239	$299
120mb	CP30100	3.5" Low Profile	19ms	116 mb	$289	$339
170mb	CP30170E	3.5" Low Profile	9ms	160 mb	$329	$379
212mb	CP30200	3.5" Low Profile	9ms	206 mb	$459	$519
540mb	CP30540	3.5" Low Profile	8.5ms	515 mb	$995	$1055

Conner drives carry a ONE Year Warranty.

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Bundled with RetroSpect v.1.3c Backup Software

Capacity	Model	Description	Media	Internal	External
155mb	Teac MT2ST/N50	Analog	CT600N	$469	$489
600mb	Teac MT2ST/F50	Analog	CT600F	$679	$699
2.0GIG	ARDAT	DAT, DDS	4mm	$1219	$1239
2.0GIG	WangDAT 1300XL	DAT, DDS	4mm	$1249	$1269
3-5GIG	WangDAT 3200	DAT, DDS-DC	4mm		$1489
2.0GIG	HP 35470A	DAT, DDS	4mm	$1329	$1349
3-5GIG	HP 35480A	DAT, DDS-DC	4mm	$1529	$1549
2.2GIG	Exabyte EXB-8200	Digital/Helical	8mm		$1859
5.0GIG	Exabyte EXB-8500	Digital/Helical	8mm		$2849

Includes RetroSpect v.1.3c Backup Software, One Tape and ONE Year Warranty

ClubMac OPTICAL Drives

Model		Capacity	Description	Seek	External
CMO-OD3000	Teac	128mb	3.5" Half Ht	45ms	$1049
CMO-LF3004	Panasonic	128mb	3.5" Half Ht	45ms	$1129
CMO-3100E	Ricoh	128mb	3.5" Half Ht	45ms	$1089
CMO-3051E	Ricoh	594/652mb	5.25" Full Ht	28ms	$2399
NEW TAHITI II	MaxOptix	650/1.0GIG	5.25" Full Ht	35ms	$3269
128mb Cartridge		3.5" Single Sided			$39
594/652mb Cartridge		5.25" - 512/1024 bytes/sec			$99

All ClubMac Opticals include ONE cartridge and ONE Year Warranty.

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FastCache Turbo 33	$359
Charger	$859

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33 MHz PowerCache*	$389	$479
40 MHz PowerCache*	$559	$649
50 MHz PowerCache*	$729	$859
Equalizer LC	$169	$239
PowerCache Adapter	$41	

*PowerCache Adapter not included

Cache Cards

FastCache IIsi	$279
FastCache IIsi with 68882	$349
FastCache IIci	$215
FastCache Quadra-Q700/900	$259
FastCache Quadra-Q700/900/950	$399

Expansion Boards

DualPort IIsi	$165
PowerMath LC	$115

Macintosh Memory

Quadra 950

16mb Module	$540
256 VRAM	$Call

Video(Q700/900)

256 VRAM	$Call

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1mb X 8- 80ns	$32
2mb x 8 - 80ns	$64
4mb X 8 - 80ns	$124
16mb X 8 - 80ns	$540

Mac IIfx

1mb X 8 - 80ns	$33
4mb X 8 - 80ns	$130
16mb X 8 - 80ns	$Call

PowerBook 140/170

4MB Memory Module	$234
6MB Memory Module	$324

PowerBook 160/180

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10MB Memory Module	$469

Duo 210/230

4MB Memory Module	$387
8MB Memory Module	$634

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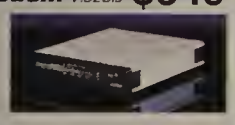
SupraFAXModem V.32bis $349

14.4 S/R fax, 14.4 data modem v.32bis, v.42bis, MNP 5 w/Fax



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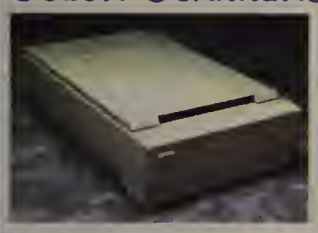
Color Scanners



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ES-600C (Adobe Photoshop-Full Vers & ScanTastic)	$1219
ES-800C (ScanTastic)	$1299
ES-800C (Adobe Photoshop and Scantastic	$1499
Auto. Doc. Feeder (ES-600C and ES-800C)	$469
Transparency Unit (ES-600C and ES-800C)	$769

MICROTEK

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NEC

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CDR-74 Multimedia Gallery	$799
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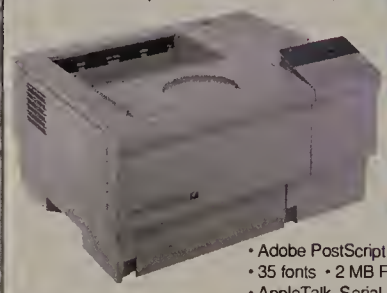
CDR-25 Express Bundle	$395

NEC CD-ROMs for the PC

CDR-74 PC Multimedia Gallery	$799
CDR-74 with PC Interface	$649
CDR-25 PC Express Bundle	$395



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SuperMatch 20 Color	$1499
SuperMatch 17•T Trinitron	$1099
21Platinum (Black and White)	$999

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WARRANTY
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Spectrum/8•24 PDQ	$829
Spectrum/8 Series III	$419

Accelerators

Radius Rocket 25i	$1199
Radius Rocket 33	$1989
RocketShare	$399
SCSI-2 Booster	$249

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PrecisionColor Pivot	$945
PrecisionColor 20/S	$2319
PrecisionColorr/20	$2319
PrecisionColor/19	$2029
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Two Page Display/21	$1149
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PrecisionColor 24XP	$489
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Pivot (SE/30, IINuBus, LC)	$249
TPD (Mac II, IIsi, SE, SE/30)	$379
PowerView	$489

Color Display Adapters

RasterOps 24XLi	$1939
PaintBoard 24 / Li	$1549 / 829
RasterOps 8XLi / 8XL	$929 / 465
RasterOps 24Mx / MxO	$1165
RasterOps 24Sx	$619

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MediaTime	$1549
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RasterOps VideoTime	$1165

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20T MultiScan Trinitron (2075M)	$2599
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ClearVue/SD21 (2570)	$1399
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Thick/Thin/10BaseT, 64K, FPU Chip	$289
Thick/Thin, 64K, FPU Socket	$149
Thick/Thin, 64K, FPU Chip	$239
Thick/10BaseT, 64K, FPU Socket	$149
Thick/10BaseT, 64K, FPU Chip	$239

Mac LC & LCII (020 & 030 PDS)

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Thin/10BaseT, FPU Chip	$289
Thick/Thin, 64K, FPU Socket	$149
Thin, FPU Chip	$239
10BaseT, FPU Socket	$149
10BaseT, FPU Chip	$239

Mac SE (68000 PDS)

Thick/Thin/10BaseT, 32K	$199
Thick/Thin, 32K	$149
Thick/10BaseT, 32K	$149

FIVE Year Warranty

SCSI Products

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PowerBook, Thick/Thin/10BaseT	$329
10BaseT, Includes SCSI Cable	$239
PowerBook, 10BaseT, Includes SCSI	$269
HDI-30 & DB-25 cable for PowerBooks	$45

FriendlyNet Adapters

Thin FriendlyNet Media Adapter	$79
Thick FriendlyNet Media Adapter	$79
10BaseT FriendlyNet Media Adapter	$79

10BaseT

10BaseT Hub w/12 10T, Thick & Thin ports$	479
10BaseT Hub w/8 10T. Thin ports	$239
12-port Smart Hub	$779
12-port Smart Hub w/SNMP H/W Module	$899
1012 & AsantéView /Mac 2.0, Out-of-Band	$899
1012 & AsantéView/Mac 2.0, 1B/OOB, SNMP	$1199
AsantéView/Mac 2.0 Software	$249
SNMP H/W Module for Asanté Hub 1012	$239
SNMP Card Agent for Mac (12-Pack)	$119
AsantéView software only/Mac 2.0	$239

Bridging

10BaseT Media Attachment Unit	$79
AsantéPrint, Thick/Thin	$329
AsantéPrint, Thick/10BaseT	$329

Token Ring Products

4/16 Mbps Token Ring Card, Mac II	$479
4/16 Mbps Token Ring Card, Mac IIsi	$359
4/16 Mbps Token Ring Card, Mac LC$	359
4 Mbps Token Ring Card, Mac SE	$359

Warranties...
- All items manufactured by ClubMac are returned to ClubMac for warranty repair.
- All other items carry manufacturer's warranty.

Money Back Guarantee...
- All products manufactured by ClubMac carry a 30 day money back guarantee.
- ClubMac extends all other manufacturers' return policies to its customers.
- Non-ClubMac products carry 30 day money back guarantee when specified.

Returns...
- Call for RMA number!
- Any product that is returned WITHOUT an RMA number will be refused.

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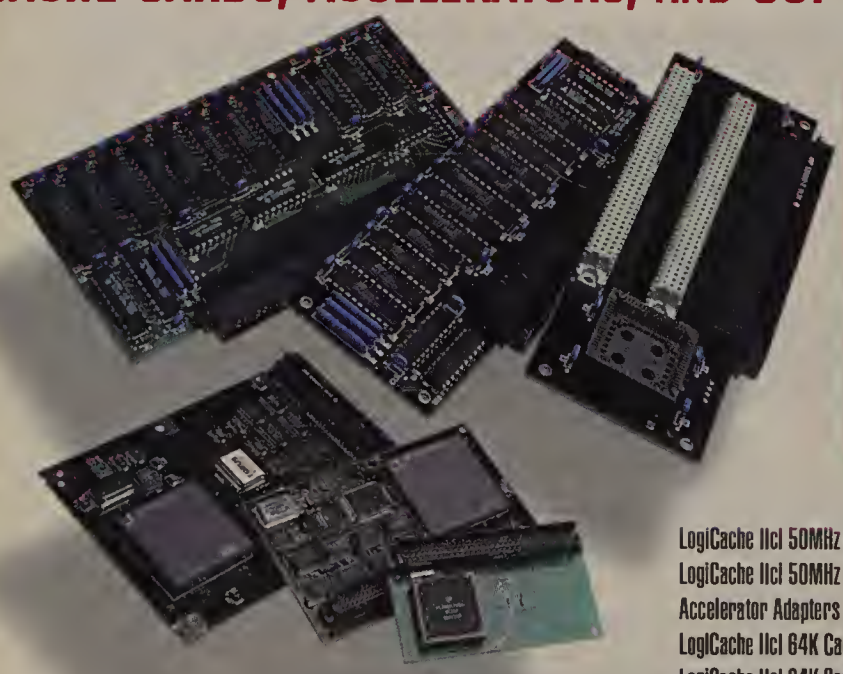

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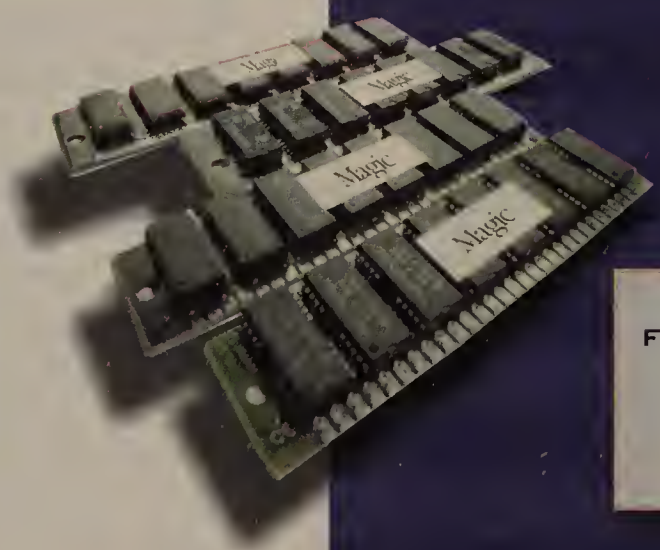

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Circle 4 on reader service card

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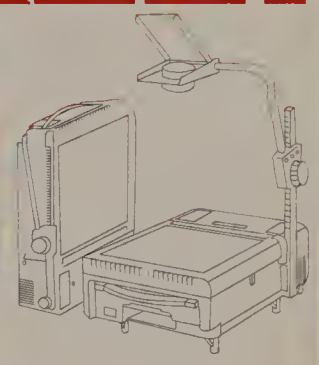

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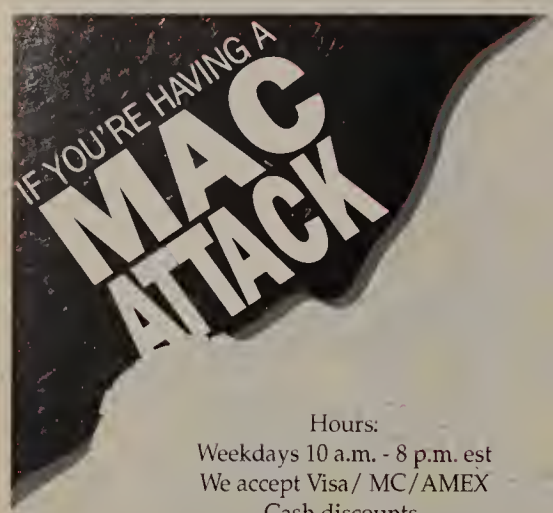

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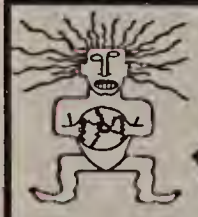

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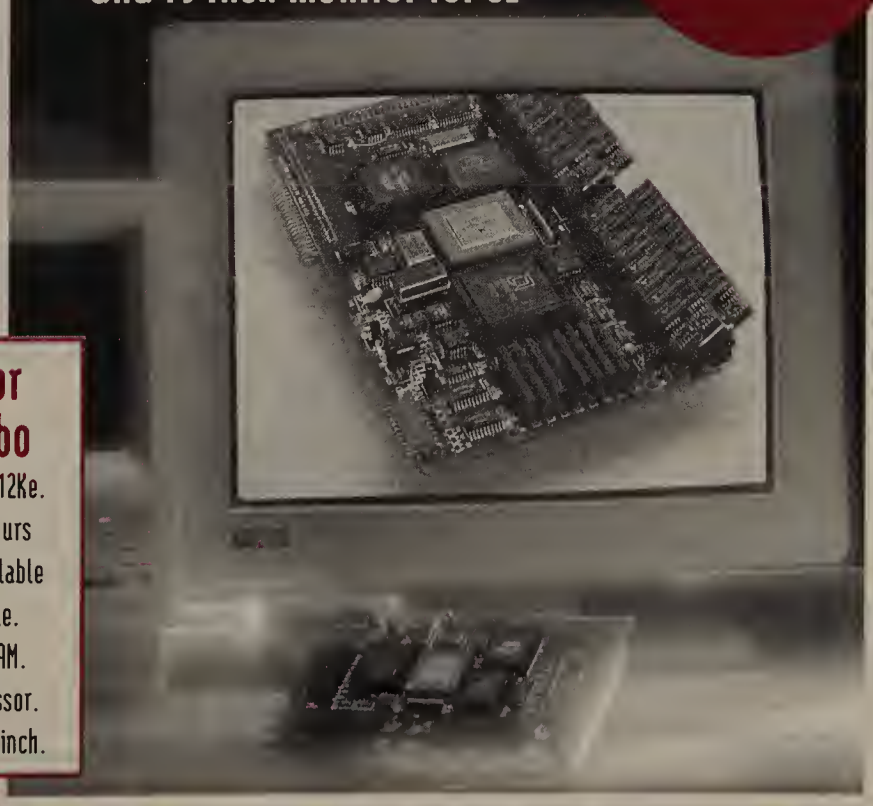

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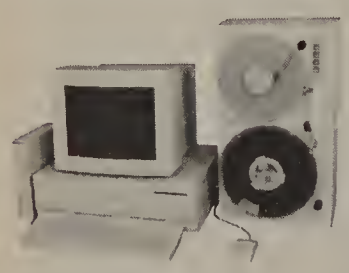

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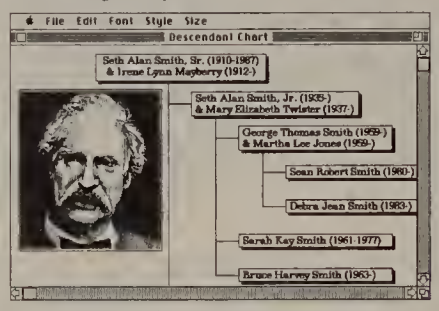

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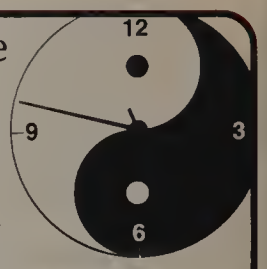

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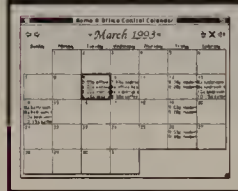

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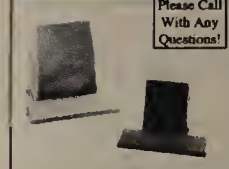

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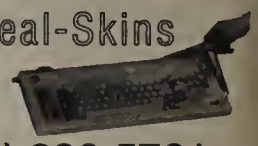

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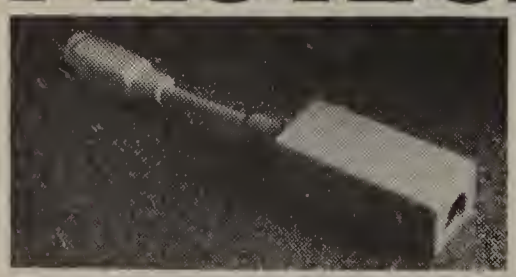

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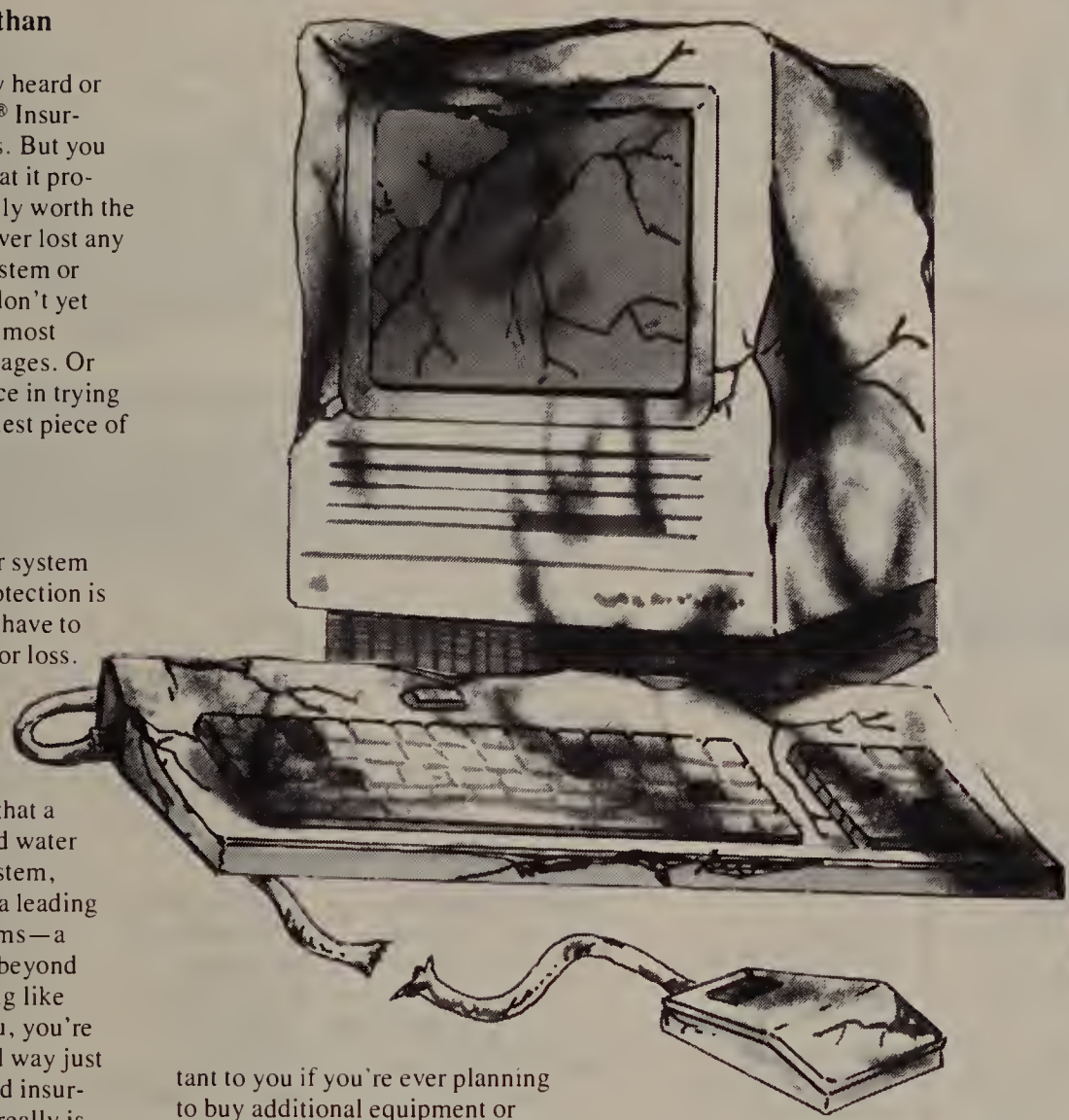

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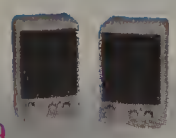

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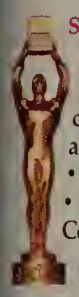

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B11.	Environmental Data Disc	189.95
B12.	Economic Data Disc	189.95
B13.	US Atlas	79.95
B14.	Lucas Game Pack	(bundle only)
B15.	Color It!	299.95
B16.	Publish It!	199.95
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B20.	Manhole	34.95
B21.	Scenic & Nature III	69.95
B22.	Scenic and Architecture	69.95
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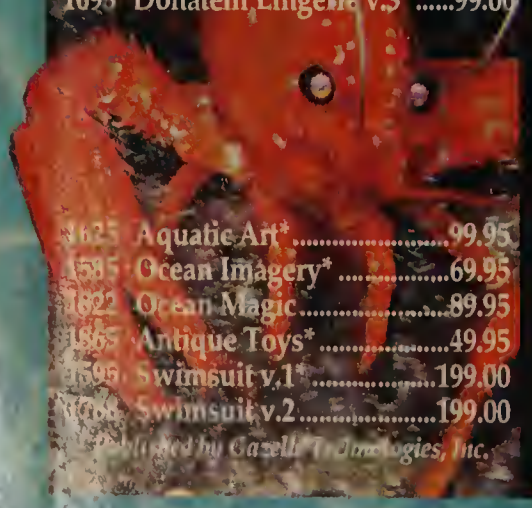

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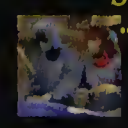

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Published by Art Sector One

1819 Funny Business .. $129.95
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1680 GraphTec Graphic Designs $49.95
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1990 Wraptures Two $95
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1653 Wraptures One
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2078 Animal Alphabet $59.95

Colorfully animated, this engaging program is designed to help young children learn letters and words. Each letter is represented by an animal. Select an animation, QuickTime video, or narrated sentence based on the chosen letter.
Published by REMedia

1924 ABC Songbook $29.95
Entertaining from A to Z as you hear a story related to each letter of the alphabet. Rockin' tunes and funny stories.
Published by Gazelle Technologies, Inc.

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2069 QuickLaffs v.1 .....$79.95
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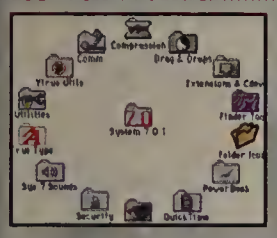

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2068 The Journeyman Project $79.95
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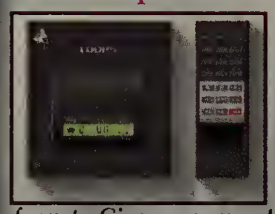

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Published by Interactive Records

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From artists to zoologists, there's something for everyone! This 2-disc set is loaded with the best public domain & Shareware software available. Over 1 gigabyte. You'll find education, business, graphics, desk accessories, utilities, sounds, games and much more! You'll also get an easy-to-use HyperCard Browser. $50 off with CD-ROM drive purchase from EDUCORP.
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1327 ExoticaROM 3.0. .....$99.95
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1408 Designer Tookit.$99.95
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Best-Sellers

MARCH 1993

Business Software

Months on chart	Last month	This month	
85	2	1	**Microsoft Excel** *Microsoft Corporation*
16	1	2	**Microsoft Office** *Microsoft Corporation*
94	3	3	**Microsoft Word** *Microsoft Corporation*
46	4	4	**FileMaker Pro** *Claris Corporation*
15	6	5	**MacDraw Pro** *Claris Corporation*
71	8	6	**Microsoft Works** *Microsoft Corporation*
8	5	7	**ClarisWorks** *Claris Corporation*
32	7	8	**Quicken** *Intuit*
46	9	9	**WordPerfect for the Macintosh** *WordPerfect Corporation*
70	15	10	**MacWrite II** *Claris Corporation*
69	10	11	**MacDraw II** *Claris Corporation*
9	11	12	**1-2-3 for the Macintosh** *Lotus Development*
34	13	13	**QuarkXPress** *Quark*
81	12	14	**Aldus PageMaker** *Aldus Corporation*
24	14	15	**MacProject** *Claris Corporation*

Education Software

Months on chart	Last month	This month	
17	—	1	**Math Rabbit** *The Learning Company*
2	—	2	**The Writing Center** *The Learning Company*
60	1	3	**Reader Rabbit** *The Learning Company*
5	2	4*	**The Playroom** *Broderbund Software*
30	5	4*	**Where in the USA Is Carmen Sandiego?** *Broderbund Software*

* tie

Entertainment Software

Months on chart	Last month	This month	
59	2	1	**Microsoft Flight Simulator** *Microsoft Corporation*
5	5	2	**Space Quest III** *Sierra On-Line*
5	4	3	**King's Quest IV** *Sierra On-Line*
33	1	4	**Tetris** *Spectrum HoloByte*
34	—	5	**SimCity** *Maxis*

Network/Data Communications

Months on chart	Last month	This month	
40	1	1	**PhoneNet** *Farallon Computing*
9	3	2	**AppleTalk Remote Access** *Apple Computer*
—	—	3	**Etherlink NuBus** *3Com Corporation*
63	2	4	**AppleShare** *Apple Computer*
21	—	5	**White Knight** *FreeSoft Corporation*

Add-In Boards

Months on chart	Last month	This month	
23	1	1	**Macintosh IIsi NuBus Adapter Card** *Apple Computer*
7	4	2	**Macintosh II FDHD Upgrade** *Apple Computer*
27	2	3	**Macintosh Display Card 8•24** *Apple Computer*
—	—	4	**MacCon3 for NuBus** *Asanté*
8	5	5	**Spectrum/8** *SuperMac*

Utility Software

Months on chart	Last month	This month	
22	1	1	**After Dark** *Berkeley Systems*
33	3	2	**SAM** *Symantec Corporation*
28	2	3	**Norton Utilities for Macintosh** *Symantec Corporation*
12	4	4	**More After Dark** *Berkeley Systems*
22	—	5	**Virex** *Microcom*

The AmCoEx Index of Used Mac Prices

Machine/RAM/ Hard Drive	Average Sale Price	Monthly Change
Mac SE/2MB/20MB	$700	+$25
Mac Portable/1MB/40MB	$600	$0
PowerBook 100/4MB/40MB	$800	+$25
PowerBook 140/4MB/40MB	$1350	$0
Mac Classic/2MB/40MB	$625	+$25
Mac SE/30/2MB/40MB	$1450	-$50
Mac LC/2MB/40MB	$825	+$25
Mac II/4MB/40MB	$1300	-$100
Mac IIsi/3MB/40MB	$1175	-$100
Mac IIcx/4MB/80MB	$1500	-$275
Mac IIci/4MB/80MB	$1850	-$250
Mac IIfx/4MB/80MB	$2700	-$200
Apple 12-inch B&W display/board	$125	-$25
Apple 13-inch RGB display/board	$425	-$50
LaserWriter Plus	$800	-$50
LaserWriter IINT	$1150	-$300

Index provided by the American Computer Exchange of Atlanta, Georgia (800/786-0717). It reflects sales during week of December 21. Configurations include keyboard and exclude monitor and display board for noncompact models.

Source: Exclusive Audits & Surveys research from more than 250 Macintosh retailers and selected mail-order vendors. Covers sales during November 1992.

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20-inch ProView V 8-bit $1799, *24-bit* $2099

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MEDIA: 1042

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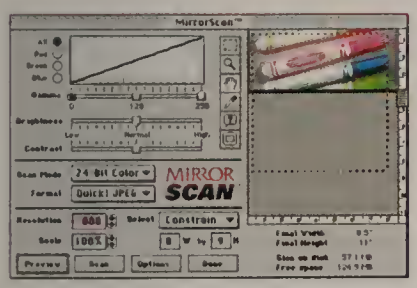

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